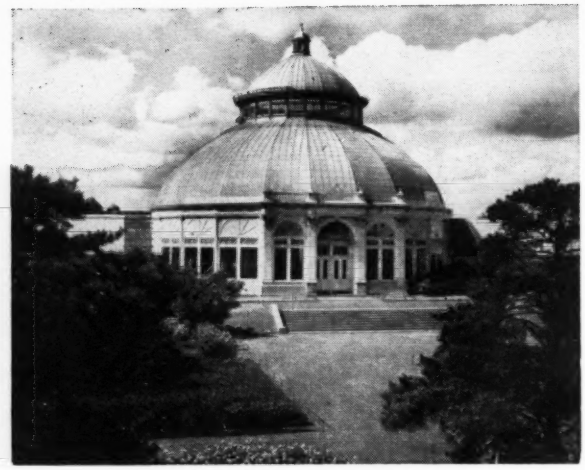
THE GARDEN JOURNAL

OF THE NEW YORK BOTANICAL GARDEN



December 12 - January 19, 1959 — Christmas Show in the Conservatory of The New York Botanical Garden.

January 8, 15, 22, 29, 1959 — Downtown Lecture Series sponsored by the Volunteer Associates of The New York Botanical Garden. Mrs. John Fiske is chairman of the Lecture Committee.

January 23-March 16, 1959—House Plant Show and display of flowering plants in the Conservatory of The New York Botanical Garden.

February 4, 1959—Annual Members' Day of The New York Botanical Garden; guest speaker, Dr. William C. Steere, Director of the Garden—"Flower Gardens of the Arctic." Mrs. L. Whittington Gorham is chairman of the Committee on Arrangements.

March 10, 1959 — Theatre Benefit sponsored by the Volunteer Associates of The New York Botanical Garden: "Daarlin' Man" starring Shirley Booth and Melvyn Douglas.

March 7-14, 1959—International Flower Show, Coliseum, Columbus Circle, New York City. The New York Botanical Garden will have an exhibit of plants that grow in shade.

May 4, 1959—Spring Garden Tour, lower Connecticut, sponsored by the Volunteer Associates of The New York Botanical Garden.

THE GARDEN JOURNAL
of The New York Botanical Garden
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DOROTHY EBEL HANSELL
Editor

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AMONG OUR CONTRIBUTORS

VICTOR GREIFF is a retired professional engineer (electrical) who has been a life-long student of botany, physics and chemistry and a lover of plants. In his early childhood he subscribed to George W. Park's FLORAL MAGAZINE, published in Libonia, Pennsylvania, and received with the annual subscription of twenty-five cents several seed packets as premium. These and other seeds flourished in his first garden on a commercial truck farm in upper Manhattan. Mr. Greiff built his present garden and greenhouse twenty years ago. Meanwhile he has been president of the Men's Garden Club of New York and active in their flower shows, currently conducts classes in gardening, contributes a column on the "Home Greenhouse" to FLOWER GROWER, and is technical editor of UNDER GLASS, a bimonthly published by Lord and Burnham Co. "Hang It: For Beauty and Space Utilization" is based on an article which appeared in a recent issue... DAVID G. LEACH is a geneticist who hybridizes rhododendrons on a fairly large scale—"sheer self-indulgence, for I have no commercial interest and do not sell plants." However, Mr. Leach has two definite goals—to contribute to genetics as a science and to create improved hybrid rhododendrons for the nursery industry in cold climates. His comprehensive study of the genus, RHODODENDRONS OF THE WORLD, is being prepared by Scribner's for publication in this country and in Great Britain. When winter halts hybridizing, Mr. Leach indulges in wild life photography — his photographs of East African animals taken last winter are now being prepared for publication ... DR. DAVID J. ROGERS is Curator of Economic Botany, and Editor of ECONOMIC BOTANY, at The New York Botanical Garden ... MARGARET (MRS. ALEXANDER) PINNEY has made a study of miniature roses in her garden and in her home ... DR. H. W. RICKETT is Bibliographer and Acting Assistant Director of The New York Botanical Garden ... After serving for a time as Dean of the College of Arts and Sciences, University of Pennsylvania, and director of the college collateral courses, DR. JOHN H. FOGG, JR., became Vice-Provost of the University in 1944. He resigned from the latter position in June 1953 to become Director of the University's Morris Arboretum. Dr. Fogg, who is also Professor of Botany at the University, has long been widely known for his research and publications in the botanical field. He is a botanical consultant to E. R. Squibb and Son, and in this capacity has been sent twice to southern Asia (India, Ceylon, Burma, Thailand and Singapore) to search for vitally important drug plants. He has also made several trips to Mexico and Central America ... DR. FARIS M. BLAIR is a well-known ear, nose, and throat specialist. He has for many years been interested in roses, raising new seedlings as a hobby. More recently he has experimented with clematis and his garden in Seattle, Washington, contains many large-flowered clematis he has raised from seed. He wrote "I have so many clematis seedlings that I really need a farm to take care of them, but that does not seem possible, especially as I shall be seventy-eight years old on December 5, 1958."... WELLINGTON F. SCOTT, JR., is a keen plantsman, with a particular interest in iris and orchids ... T. H. EVERETT is Curator of Education and of Horticulture at The New York Botanical Garden ... DR. H. A. ALLARD retired in 1946

(Continued on page 39)

CREDIT FOR ILLUSTRATIONS

We are indebted to the Display Committee, Mrs. Charles Burlingham, Mrs. Richard S. Meredith, Mrs. Donald B. Straus, for the selection of the front cover illustration — winter scene at The New York Botanical Garden by E. N. Mitchell, staff photographer; p. 1, sketches of **Bilbergia nutans,** upper left, **Gloxinia** and **Aeschynanthus,** upper right, and **Begonia glaucaphylla** lower, by Paul Pugliese; p. 2, upper left, upper right, Victor Greiff, lower left, lower right, Longwood Gardens by G. Hampfler, lower third column Walter Singer; p. 5, H. W. Rickett; p. 6, Louis O. Williams; p. 7, David J. Rogers; pp. 8, 9, 10, 11, Edmund B. Gilchrist, Jr.—courtesy Morris Arboretum; p. 12, 13, 14, W. F. Scott, Jr.; p. 15, Don Normack; pp. 16, 17, 18, 19, T. H. Everett; p. 20, 21, H. A. Allard; p. 22, upper, H. A. Allard, lower, E. C. Leonard; pp. 24, 25, 27, sketches of **Chrysanthemum uliginosum, Papaver rhoeas, Trillium grandiflorum** and **Gentiana crinita** by Charles C. Clare, Jr.; p. 26, courtesy Toledo Blade; pp. 30, 31, Walter Singer; p. 36, E. N. Mitchell.

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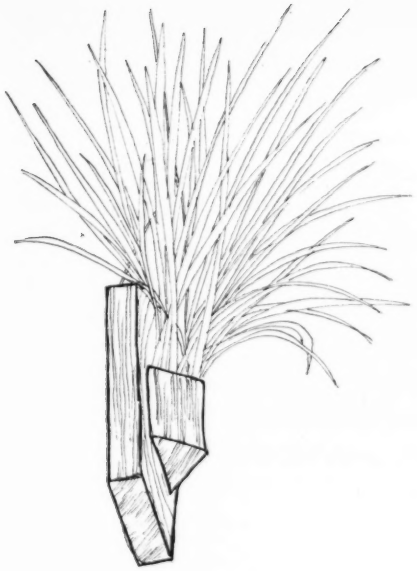


Hang It:

FOR BEAUTY

and

SPACE UTILIZATION

By Victor Greiff

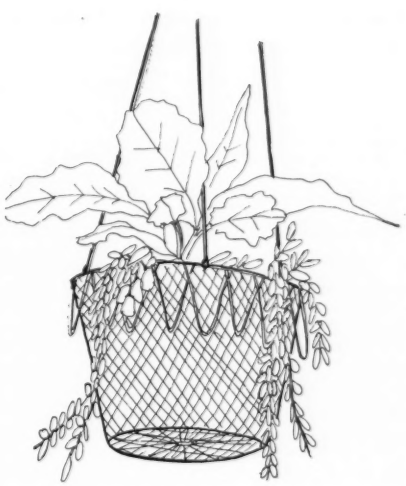
WHEN WE SAY stretch the greenhouse, do not think us frivolous or facetious, for every greenhouse owner knows that his greenhouse isn't large enough. We don't recommend a hydraulic jack or even a sacroiliac board to stretch garden or gardener, but just call attention to the fact that: growing more plants, or more kinds of plants at more times of the year, is extending your year-round gardening field, so in effect "stretching" your greenhouse.

Estate and commercial gardeners knew and practised many such expedients, their livelihood depended upon their proficiency and resourcefulness, and their training in such matters is rarely duplicated today. So, I must disclaim expertness or authority in my comments, which merely record the impact of a few facts and observations of an amateur.

Suspending containers of plants in the overhead space of the greenhouse, over aisles or over benches obviously adds a third dimension to the layout, making possible a much greater content of plant population. This is commonly utilized by orchid growers, with little other purpose, except in the case of a few species which really are at their best grown in this way. The massive unkempt clump of *Oncidium sphacelatum* with its long spikes of "dancing ladies" is only to be tolerated if hung up out of the way. Some other species, for example stanhopeas, call for special provision for their pendant inflorescences, and require special suspended containers for perfect development.

The expert greenhouse show men, however, grow hanging baskets or "hangers," as they term them, of a wide variety of plants which respond to this condition in special ways producing their own brand of glamor. Perhaps the most homely and familiar one is "grandmother's" oxalis. Several species of this genus (perhaps the most colorful and manageable is offered as *O. crassipes*) are merely weak of growth, and are grown suspended by even the least sophisticated indoor gardeners. This plant and the spider-lily *(Chlorophytum* sp.) and the strawberry begonia or mother-of-millions *(Saxifraga sarmentosa)* are often seen in the tin-can type of hangers. The last is more usually pictured in the bowl-shaped clay pot, with integral drip saucer, made for many years but finally cast out by the potters because of high breakage, and now a collector's item.

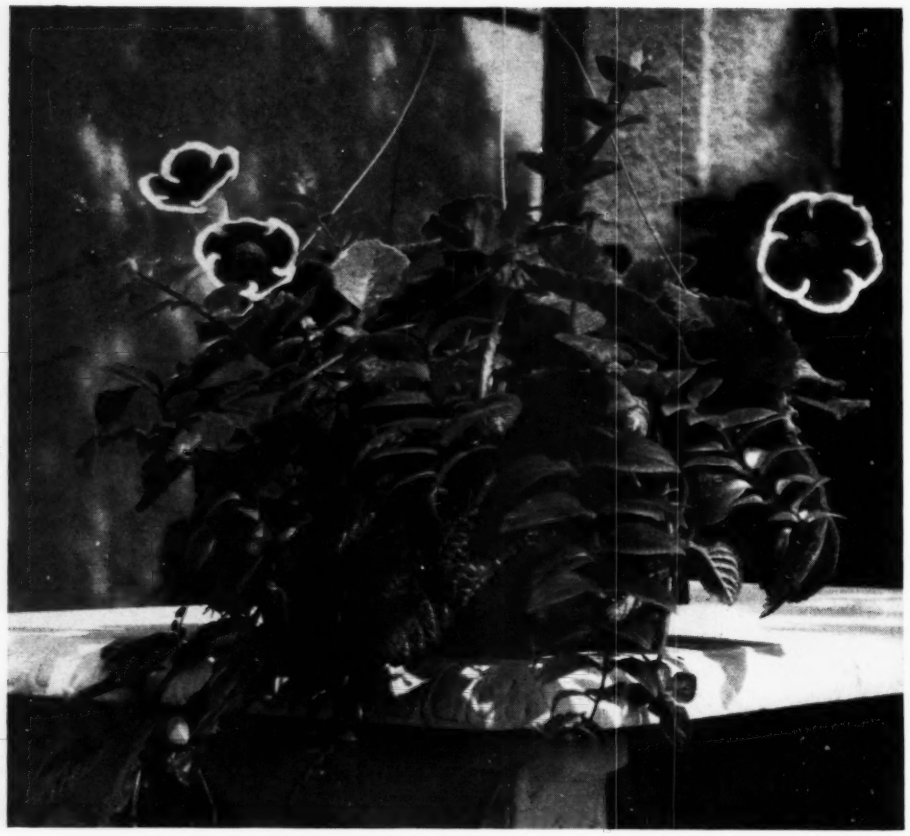
The classical hanger of the florist trade is a wire basket hung on wire hooks, lined with sheet moss common in the trade and filled with a more or less spongy soil mixture. In this class come the magnificent ornaments of the public show houses including geraniums, browallia, lobelia, fuchsias, and tuberous begonias. These latter, particularly, drip color and delight visitors, seconded by the spectacular blue of browallia. In



fact, recent development of trailing tuberous begonias is responsible for a revival of the trade in wire baskets. Begonia specialists prefer other begonias notably *B. glaucophylla scandens (B. Limminghei)* and its variants and the fern-like *B. foliosa.*

Any non-rusting household strainer or collander may be diverted to this use. Somewhat more sophisticated are the "log cabin" type baskets of interlocking wooden pieces, made in small or large sizes, somewhat similar to orchid "rafts."

To the year-round plant collector "hangers" offer an excellent means of meeting the cultural needs of certain plants. Construction may vary from the simple makeshift of stuffing wet sphagnum around a potted plant in a wire basket, to sphagnum, osmunda and tree-fern or other bark structures, or tree branches as usually used for bromeliads, orchids, staghorn ferns, and other epiphytes. Henry Teuscher, of Montreal, has shown, or at least reminded us, that practically all plants can be well grown in sphagnum with nutrient watering. Plants of trailing habit, which tend to root at nodes, are ideal for culture in a basket of sphagnum. Foremost in this field are the gesneriads (excepting *Saintpaulia*) and plantings in pure sphagnum of *Gloxinia, Episcia, Columnea* and *Aeschynanthus* are automatically successful. The program of watering, fertilizing, and neglect are appar-



Log-cabin basket, with gesneriads, is taken outdoors to be photographed.

ently non-critical. The larger episcias show their beauty in curtains of growth and bloom, and the delicate *E. dianthiflora* needs only a well-drained coffee can of sphagnum to produce a miniature "hanger" of growth and fringed flowers.

Don't let this get you down! The great endowed public gardens spare no skill and effort in producing these gorgeous phenomena for the amazement and pleasure of visitors. Above, gardeners move a cascade chrysanthemum into the conservatory of Longwood Gardens; right, gardener secures the cascade plant aloft in the conservatory.

The collection of Gesneriads at Cornell demonstrates the predilection of many of this family for the hanging position. Combinations of Gesneriads in sphagnum should and do produce spectacular hanging baskets.

Among the succulents *Othonna crassifolia* is an old favorite, while sophisticates prefer *Sedum morganianum* dripping with "tails" and *Kitchingia (Kalanchöe) uniflora* with urn-shaped flowers, or the tangling *Ceropegia woodii*.

The tradescantias are obvious choices but few gardeners know the lovely

Zygocactus is happy in a plastic berry basket stuffed with sphagnum.

Begonia Limminghei grows in a basket in the Conservatory of The New York Botanical Garden.

fine-leaved and floriferous *T. multiflora*, named by us "baby's breath." Some courageous grower can try the related *Spironema fragrans*, but must be prepared for "runners" yards long.

Some ingenious gardeners make baskets to suit their fancy of small mesh galvanized "hardware cloth" and grow complete gardens in soil in them, but these often miss the possibilities for beauty. Their growing habits indicate that zygocacti are suitable subjects of hanger culture. A veteran greenhouseman tells of growing them on a "moss wall" of sphagnum held behind wire mesh. Such a wall, recently demolished in a Park Department economy drive, harbored also *Cryptanthus* and *Saxifraga sarmentosa*. A plastic berry basket stuffed with sphagnum grew a fine *Zygocactus truncatus*.

Some irregular hanging plants need no container, but grow in pieces of solid material. Aside from the infinite variety

(Continued on page 23)

THE RE-CREATION OF A SPECIES

By David G. Leach

BOTANISTS with a special interest in the native azaleas have been intrigued by the three new species described in the late 30's and early 40's by W. P. Lemmon, individually and with J. A. McKay. The American azaleas had been without additions to their ranks since the time of the First World War. The newcomers were widely discussed.

The azalea which was later named *"R. furbishii"* was discovered as a colony of about one hundred plants in Vogel State Park at Neel Gap, Georgia, in 1934. After seven years of observation and study, according to Lemmon, he described it as a new species (in *Bartonia* 21: 5-6, 1940-41).

In 1948 I had an opportunity to examine the handsome pink-flowered plants from the colony described by Lemmon. It seemed to me that they were probably early generation hybrids between *arborescens* and *bakeri*. As I speculated about their origin on subsequent occasions, my interest was further aroused; and in 1952 I determined to satisfy my own curiosity by proving or disproving my theory.

I crossed *bakeri* with *arborescens* under controlled conditions in an effort to duplicate *"R. furbishii"* as it was found in Georgia. The characteristics of my hybrids and those given by Lemmon in his original description offer the comparison given in the chart.

The hybrid plants produced from my cross, now six years old, are almost identical with those described in the wild by Lemmon. They could be added to the colony at Vogel State Park in Georgia, and no botanist could distinguish them from the indigenous population. Both bloom at the same time. Both exhibit the same flat-topped, heavily-branched growth habit and rather low stature.

One of many conspicuous differences between the white-flowered *arborescens* and the red-flowered *bakeri* is in the twigs, the former being naked and smooth, the latter bristly. Both *"R. furbishii"* and my own synthetically produced hybrids are intermediate between the two parents in this characteristic, as they are in flower color and in many other respects.

The evidence on a genetic basis is conclusive: *"R. furbishii"* is a hybrid, and it is probably not even an advanced generation hybrid, but the first offspring of a simple natural cross in the wild between *arborescens* and *bakeri*.

At the time the controlled cross was made at my trial grounds between the two species in 1952, I hoped for a duplication of *"R. furbishii,"* but I could not be certain that this bit of genetic detective work would produce such clear and final evidence. I arranged therefore to get self-pollinated seeds from the wild plants in Georgia. I expected the plants they produced to provide supporting evidence for my theory.

Such an expectation was based on the fact that plants in nature in an isolated group become more and more alike with the passage of time until finally each generation is a duplicate of the preceding and a stable species evolves which retains its identity as it reproduces itself. But early generation hybrids do not "come true" from seeds. They betray their forebears by producing offspring exhibiting the characteristics of their progenitors in various clear combinations.

This describes exactly the plants produced from the self-pollinated seeds of *"R. furbishii."* Some of the characteristics of *arborescens* and of *bakeri* even appeared among the seedlings in the classic segregating proportions. Flower color ranged from true *bakeri*-red to *arborescens*-white, with larger numbers intermediate pinks, many of which are of unusual ornamental value. A few plants have white flowers with a yellow blotch on the upper lobe contributed by *bakeri*, suggesting that this is probably the origin of the blotched *arborescens* which has been proposed as a distinct variety of the species or even as a separate species. There are a few plants with interesting ivory, buff and amber-colored flowers similar to occasional specimens which can be seen in the North Carolina mountains.

In vegetative characteristics the variation is equally complete, minor proportions of the seedlings exhibiting the extremes of the dissimilar parents and larger numbers showing modification imposed by interaction of the two genetic heritages.

The re-appearance of *bakeri*-like and *arborescens*-like plants together with a range of intermediates in the offspring of *"R. furbishii"* makes doubly final the conclusive evidence obtained from the other experiment. *"R. furbishii"* is not a valid species as described by Lemmon and accepted by Hume and others. Its hybrid status has been clearly proved. Under the International Code of Bo-

	"R. furbishii"	*arborescens x bakeri*
Corolla	Lobe edges shell pink, upper lobe with large orange blotch.	Same
Upper Lobe	15 mm. wide x 21 mm. long	Same
Laterals	12 mm. wide x 21 mm. long	12 mm. wide x 23 mm. long
Lower Lobes	12 mm. wide x 21 mm. long	12 mm. wide x 26 mm. long
	Tips recurving, edges revolute	Same
Corolla Tube	2 to 2.5 cm. long to beginning of expansion, strongly ridged, pubescent and eglandular within; exterior viscid, pubescent and with some glandular hairs.	2 cm. long, otherwise the same
Corolla Hairs	Tipped with white glands	Same
Filaments	White, pubescent at base, carmine above.	Same
Anthers	Deep orange	Brown
Style	Carmine, pubescent at base only	Same
Stigma	Dark carmine	Purple
Ovary	Densely pubescent with long hairs	Same
Pedicel	Eglandular	Same
Calyx Lobes	Unequal, ciliate, base strigillose and eglandular.	Same
Twigs	Glabrous, or with occasional hair.	With occasional hair.
Petiole	2-4 mm. long, strigillose, channeled above, edges pubescent, long hairs.	Same
Leaf Blade	Elliptic, gland-tipped, veins impressed, midrib strigillose and pubescent, strigillose beneath.	Same, edges ciliate.
	3-6 cm. long, 1.5-3 cm. wide, light green, glaucescent beneath.	3-5.5 cm. long, 1.3-2 cm. wide, light green, variably green to glaucescent beneath in different seedlings.

tanical Nomenclature, it should henceforth be designated *"Rhododendron* x *furbishii* Lemmon pro sp."

The general tendency of botanists not to recognize the scope and scale of natural hybridity among American azaleas in the wild has been all but universal. In his description in BARTONIA Lemmon even mentions that "plants showing hybridism with *A. arborescens* were found nearby..." but still he concluded that the colony of distinct plants first found in 1934 constituted a new species.

The American azaleas have been sporadically studied by amateur naturalists and by professional botanists since about 1690. In relation to their importance in the region and their influence on our horticulture, the observations are limited in number and generally superficial in character. Only a few of the published studies make any reference to natural hybrids and most of those only in the most tentative and timid manner; yet hybridity is the most conspicuous single feature of the entire azalea population of our southern mountains. Even the most recent studies, by such researchers as Skinner and Galle, have only begun to dispel the "marked limitations of our present knowledge of the botany, genetics or even geographic distribution of the native *(Azalea)* species."

A review of the material published on the American azaleas fails utterly to give any real conception of the enormous scale on which hybridity exists. No comprehensive study of the vast hybrid azalea populations has yet been made, though their existence has at last been recognized and recorded by several observers, and more work is under way.

The magnitude of azalea hybridity in the Southeast naturally leads to speculation about the validity of Asian rhododendron species. From observations made in the preparation of my book on rhododendrons, I believe there is evidence to suggest that numerous *Rhododendron* species from the Orient are no more entitled to specific distinction than is *"R. furbishii."* The Triflorum, Neriiflorum and Lapponicum series and the Roxieanum subseries are in chaotic condition with respect to the definition of the species in them, and the criteria by which they are purported to be recognizable. Elsewhere, some groups of allied species serving as links between others more sharply defined give evidence of themselves being natural hybrids recently evolved, and it may yet be determined that these entire series are no more than early generation progeny of accidental crosses in the wild. I am convinced that *R.R. concatenans* and *xanthocodon*, for example, are merely two more in the swarm of varieties and natural hybrids, all of which should constitute the species we call *cinnabarinum*.

I suggest that rhododendrons are especially in need of study by geneticists and that our knowledge of them could thus be enormously expanded. The field collectors and botanists, who have observed rhododendrons in their native habitats, have been oriented toward the viewpoint of the systematist, who is trained to see *resemblances* among plants, and hybridization in the wild, which is primarily repeated backcrossing of natural hybrids with the original plant population, produces offspring which closely resemble the recurrent parent. Geneticists, on the other hand, are trained to see *differences*, and to search for those that may even be minute, as they seek to unravel the tangled skeins which lead back to the origins of plants obscured by the tides of time.

MINIATURE ROSES

As House Plants

By Margaret Pinney

Mrs. Pinney contributed a comprehensive article on "Miniature Roses" to The Garden Journal (Nov.-Dec. 1957, Jan.-Feb., Mch.-Apr. 1958). Thereafter we received inquiries as to how Mrs. Pinney grew these roses as house plants and what varieties.

The Editor attended Rose Day, October 8, 1958, at the Brooklyn Botanic Garden, where Mrs. Pinney talked on "Miniature Roses." This is a rewriting of the last part of her talk, which was about these roses as house plants, and is published with permission of the Brooklyn Botanic Garden as answer to the inquiries.

BABY ROSES need more care than do the patient aspidistra, ivy and philodendron. They will not sit dry, dusty, and neglected for weeks in a dark corner and still flourish. But if you satisfy their simple requests, they will reward you with a riotous succession of lovely buds and flowers. What do they ask?

First, I suppose, comes light. People who look at my south and west picture windows say, "Of course, you can grow anything with that much sun." But the fact is that in the early fall and late spring these windows actually let in too much sun for miniature roses. They prefer a limited amount; four to six hours suit them quite well. With too much glare they wither; with too little light, they grow long and yellow, and lose their leaves.

The next most important factor is drainage. Crocks in the bottom of the pot, of course, but the pot must never stand in water. Roses hate having their feet in a bog.

And that brings us to atmosphere, which should not be too dry. The best system is to stand the pots on pans of large pebbles. Water is kept nearly to the tops of the pebbles, and a cool damp atmosphere is the result. In addition, the air on the windowsill should be cool, between 60° and 70°. And be sure that there is not a leaky gas stove nearby—few house plants will thrive where there is escaping gas.

SOIL. I plant my roses in a mixture of three parts rotted compost, two parts peat moss, one part sand, one part garden soil and one-half part dried or rotted cow manure. If you are unable to obtain these country ingredients, buy the packaged potting soil and add one fifth bird gravel. These can be bought at most dime stores. Plant firmly, keep well watered but not soggy, and shade from the sun for a few days until the plants are established.

FEEDING. I feed when I think the plants need it, usually about every two or three weeks, with a liquid fertilizer such as "Hyponex" or "Ra-Pid-Gro."

DISEASES. The indoor plants, due to artificial conditions, are rather more susceptible to diseases and ills of various sorts than their outdoor relatives. In a hot dry atmosphere they are often a prey to red spider, a disgusting little nastiness called a mite, hardly visible to the unaided eye. The leaves turn a spotty yellow and the under sides and stems become covered with gray webs. The earlier you catch red spider the better. You must spray thoroughly, especially on the under sides of the leaves, with "Malathion" or "Lindane." Repeat the spraying twice a week, even after you are sure the mites have all gone.

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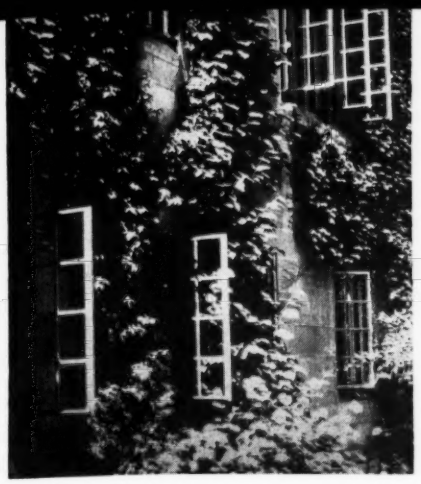


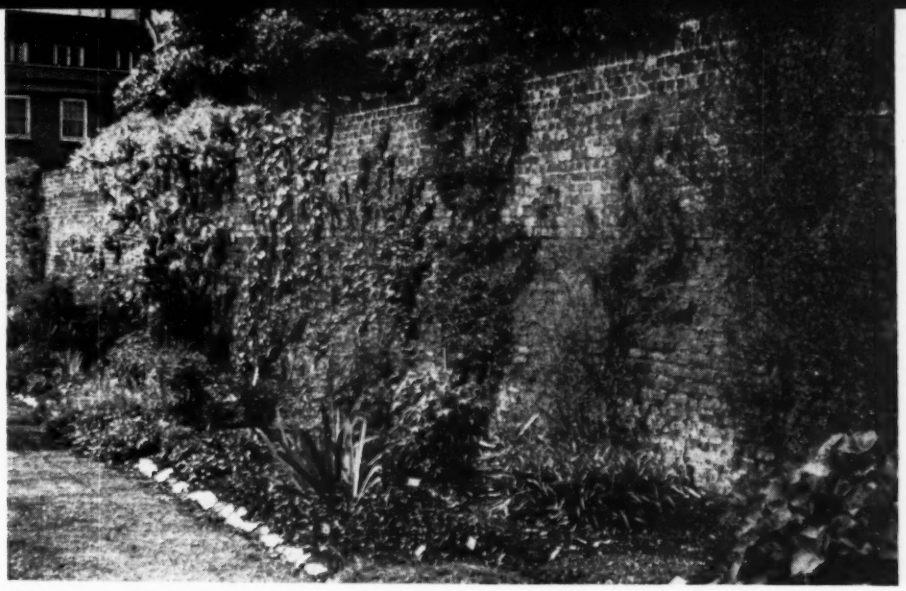
A Note On

ESPALIER PLANTS

By H. W. Rickett

THE RECENT ARTICLE in THE GARDEN JOURNAL (*8*:152, 153) on vines and espalier plants brings to mind some interesting species I have seen treated in this way. While we were attending meetings of the AIBS at Bloomington, Indiana, in August, Dr. Robert Woodson called my attention to what seemed to be an odd vine on one of the older buildings of the University of Indiana. It was *Tamarix*, apparently the same species as the shrub sometimes grown in our gardens and established as a bad weed along ditches and watercourses in the Southwest. Then we noticed a nearby wall covered with several species trained in espalier fashion. There was a *Malus*, as one would expect; and a *Forsythia*, as one would not.

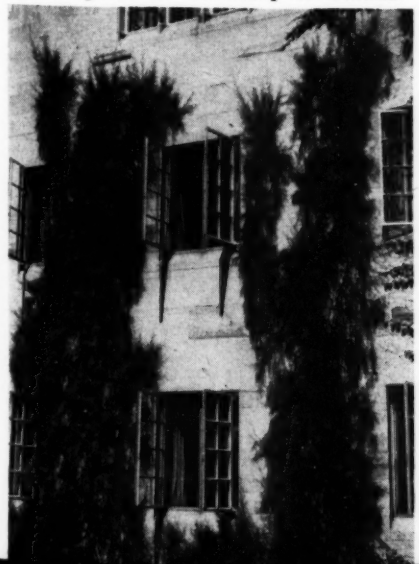
These in turn recalled an espalier pomegranate I saw last year in the old Chelsea Physic Garden in London. Nearby, on the same beautiful red brick wall, grows a fine wisteria: nothing very unusual among vines, one would say; but this one was brought from China by one of the most famous of all plant explorers, Robert Fortune.



Upper Left. An espaliered *Malus* at Bloomington, Indiana. Above. An espalier pomegranate grows on the beautiful brick wall of the Chelsea Physic Garden.

Wisteria in the Chelsea Physic Garden, London, brought from China by Robert Fortune.

Tamarix espaliered on one of the older buildings of the University of Indiana.



Forsythia has been trained against a building at Bloomington, Indiana.

WHAT IS A CULTIVAR, AND WHY BOTHER?[1]

By David J. Rogers

A FEW MONTHS BACK, when speaking to a gentleman of something more than ordinary knowledge of plant names and application of rules for these names, I was rather surprised to find that there was some rather violent disagreement with the recent recommendation[2] that the word cultivar be used regularly when speaking of cultivated plant varieties. It never occurred to me that there was anything wrong with the recommendation, but I had not dealt specifically with the objections to cultivar versus variety, and so began to look into the problem to a small extent.

The recommendation mentioned above states, "Cultivated plants are named at three main levels: genus, species, and cultivar [variety]." (Art. 7.) There is more enlightenment in Article 10: "Cultivar is an international term for the category known in different countries by different names, for example, 'variety' in English, 'varieté' in French, 'variedad' in Spanish, 'sorte' in German, 'sort' in the Scandinavian languages and in Russian, 'ras' or 'varieteit' in Dutch, 'razza' in Italian, etc.... When the terms variety, varieté, and their variants are used in the sense of cultivar, confusion with the term varietas should be avoided by a suitable explanation. Varietas refers to a botanical category intermediate between species and forma..." This seemed perfectly straightforward and reasonable to me, but these things are not always reasonable, and when a particular word has long been used by any group, it takes a long time to get rid of it. This seems to be the case here, where people for long periods of time have used "variety" to distinguish between various roses, or hybrid corn, or cultivated peonies, and now find that they must change to use what seems to be a fancy term applied without justification.

That there was justification for the recommended change is shown in the fact that the new epithet was coined by no less a person than Liberty Hyde Bailey.[3] It was he who knew that eventually there would be confusion between the various usages of the word "variety," and it was he who made a recommendation which would easily solve the whole problem. Botanists who use "variety" have a rather specific meaning for the term, and if it is used in other connections the word loses its value. Since botanists were first with some sort of published code for use of terms for plants, they seem to have something of a priority, but it behooves them further to do something useful to distinguish between the usage of "variety" in their sense and "variety" in the popular sense. For a botanist, a variety is a naturally occurring phenomenon, not dependent upon man for continuation, a subdivision of a species. Rules for recognition of varieties are not specifically stated, but some guide has been established to assist in this recognition. Usually the variety of the botanical world has enough different morphological characters to render it distinguishable from other varieties of the same species by more than one particular flower color, leaf shape, habit, and so on. It may be that two varieties of the same species may not occupy the same environmental situation, but this is not necessarily the case. But for the horticulturist, the variety is something quite different—it may be any one character which will distinguish the cultivar from all others of the same species. This character can be anything from flower color to habit to different locality to taste of fruit to differential hardiness, but need not be more than one of these. It does not worry the horticulturist that his cultivar cannot continue in existence unless he himself aids the reproduction of it, usually by vegetative techniques.

To the botanist, the variety is not recognizable unless it has a sufficient number of dominant genes so that year after year, seed set after seed set, variety "X" will be found. Almost without exception, the cultivar of the horticulturist could not be expected so to duplicate itself.

To this point, it looks as though I've been trying to make a wide distinction, if not between variety and cultivar, at least a distinction between botanist and horticulturist. There have been times when it seemed valid to differentiate between these scientists, but we hope

1/When preparing this article, I intended to use the title "What is a Cultivar?" The article in the Nov.-Dec. 1958 issue by Dr. G. H. M. Lawrence, reprinted from Baileya 3:177-181, 1955, not only preempted my title but also gave a more scholarly discussion of the same topic.

2/International Code of Nomenclature for Cultivated Plants. Regnum Vegetabile. Vol. 10, 1958.

3/"Gentes Herbarium" 1:113-114. 1923.

Fig. 2. Preparing stem cuttings of "yuca" *(Manihot esculenta)* for planting. The cuttings are four to eight inches long and are about one hundred percent certain of rooting. Lake Yojoa, Honduras.

that such times are passed. But getting back to our problem, what is a cultivar, and then, why bother?

It might be well for me to stick to an area with which I have some acquaintance, to be sure of safe footing. Some years ago, I became interested in the problem of classifying a number of specimens labeled *Manihot,* either *M. esculenta* or *M. utilissima.* There was no way to make any good sense of these specimens, and this led me into a more intensive study of a group of fascinating plants which are used by tropical people all over the world as one of their basic food plants. Most temperate zone people are hardly aware of these plants, except through one of the lesser products from them, tapioca. As I began this investigation to find the extent of variation that this species encompassed, the more confused seemed the situation. How many different varieties, oops! cultivars are there? No one seemed to have an answer; so this was to be my work for some time to come—how many different cultivars are there, and how do you tell them apart?

Long before the advent of Europeans to the western hemisphere, natives of tropical America were using these food plants (Fig. 1), called variously as cassava, or mandioc, or mandioca, or later, yuca. They carried the plants with them to nearly every nook and cranny of the vast area we know as American "tropics." These plants came eventually to be dependent upon man for their very survival, for if left alone, they would not or could not compete with native vegetation and soon died out. They even began to lose their habit of forming seed in the regular course of events, and the numbers of seed they did produce reduced to the point where it is a most insignificant number per plant per year. A possible explanation for this reduction in the production of seeds is that those who grew the plants were not interested in seeds, particularly so because they almost always propagate the plants from stem cuttings (Fig. 2). They either consciously or unconsciously selected those particular variations which did not produce seed at all. This is only hypothesis, however, and has no basis in experimental evidence.

Certainly the seed habit has not been completely lost, because in almost every planting of cassava, one may find one or two cultivars which regularly produce seed. It is further evident that the seed habit has been maintained because it is likely due (although again no experimental evidence exists) to the seed habit that numbers of different or new cultivars come into being. The way the flowers of *Manihot esculenta* are arranged, there are two separate flowers on the same plant for pollen production and for seed production. The staminate (pollen-producing) flowers appear first in the flower cluster, and pistillate (seed-producing) flowers appear after the staminate flowers of that particular cluster have withered. Therefore, if any seed is set, the pollen from another plant must have been the producer of that pollen, thus effectively enforcing cross-pollination, and most frequently, cross-pollination between different cultivars.

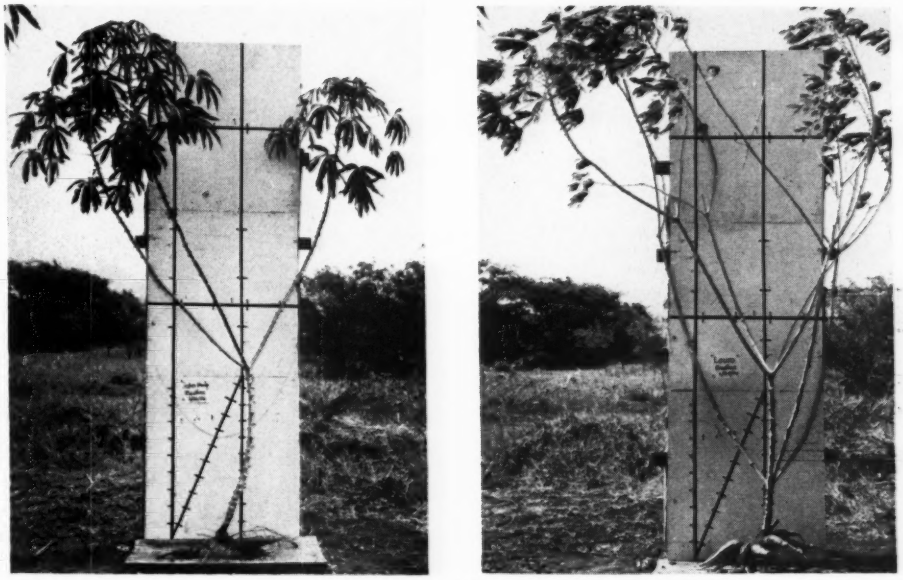


Fig. 1. Two cultivars of *Manihot esculenta* demonstrating variations within one species. Note the different pattern in branching.

Once a different cultivar has become established by cross-pollination, this cultivar may be kept going over countless numbers of plantings, because, as mentioned earlier, almost all plantings are made from stem cuttings, and few, if any, from seeds. In this case, then, man does not depend upon close supervision of pollination to continue a particular stock or strain.

Here we have a very good place to use the title "cultivar." The plants are cultivated, they are normally reproduced by vegetative means, there is little chance for them to vary (except due to variation in their cultivation), they differ by slight amounts (characteristics) from other types of variation within the species, and they would very likely die out in a short time if left to their own devices. The same application can be made to any cultivated plant species with a large number of color forms, or growth habits, or what-have-you. Even if the normal method of reproduction for a cultivated plant is by seed sowing, as with most of our annuals, there is a man-controlled method behind the continuation of the particular plant under consideration. In these cases, man has gone to considerable trouble to select pure lines as parents for seed production in order that he may predict what the offspring will look like. If this were not so, then many of the big seed producers would never have developed.

It is often possible for the seed grower to predict what his combinations will produce through the science of plant breeding. Until the development of a body of knowledge in genetics over the past fifty years, seeds sold were not nearly as predictable as those of today, and the idea of patenting a particular cultivar was not even considered. Actually, it is only within the last three decades that plant patenting became a feasible proposition. This is *not* to say that desirable variations were not maintained year after year before the introduction of scientific plant breeding, for we know of many of our most common cultivated trees and shrubs which originated many years ago. The

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THE MORRIS ARBORETUM

By John M. Fogg, Jr.

Swan Pond is a beautiful naturalistic planting at Morris Arboretum.

ALTHOUGH Philadelphia has been the recipient of many notable benefactions, few have been as thoughtfully conceived or have afforded pleasure to as many people as the bequest whereby the late Miss Lydia T. Morris willed to the University of Pennsylvania the property which is today known as the Morris Arboretum.

In 1887 Miss Morris and her brother, John T. Morris, undertook the establishment of a botanical garden at "Compton," their summer home in Chestnut Hill, a suburb of Philadelphia. It was their aim to assemble on their spacious grounds as many different kinds of woody plants as might prove hardy in this area. There was thus initiated an arboretum which today boasts one of the finest collections of mature native and exotic trees and shrubs found anywhere in the United States.

The Morris's were keenly interested in the plants as well as the culture of the Orient and as a result of several trips to the Far East brought or sent back living specimens as well as many handsome objects of art. They also lent their support to a number of expeditions, notably those of the Arnold Arboretum of Harvard University. Through these and other contacts there was gradually accumulated at "Compton" a truly representative collection of woody plants from temperate southeastern Asia.

Originally the Morris property consisted of about eighty-five acres of highly diversified terrain. Later additional pieces of land were acquired until, with the purchase of an adjoining tract lying across Northwestern Avenue in Montgomery County — a tract which was known as "Bloomfield"—the area comprised approximately one hundred and sixty-five acres.

Although the work of landscape design and development of a planting plan were largely carried out by Mr. Morris, he employed the services of Japanese specialists when it came to laying out the three Japanese gardens which are still among the most attractive features of the Arboretum. In 1900 Mr. Morris designed and supervised the construction of the unique Fernery, which is an object of special interest to visitors.

Following her brother's death in 1915, Miss Morris continued to develop the plantings and added such notable attractions as the Rose Garden and the handsome Rock Wall Garden which flanks it on three sides. This beautiful and botanically distinguished estate became in 1932, by the terms of her will, the Morris Arboretum of the University of Pennsylvania to be maintained and administered in collaboration with the Department of Botany of that institution. The residual estate constitutes an endowment to maintain the Arboretum in perpetuity. It was Miss Morris's expressed wish that, in addition to preserving and augmenting the living collections, consideration be given to the carrying on of research, the development of an educational program, and the dissemination of a knowledge of plants through publications.

In 1948 the Arboretum acquired "Overlea," the home of Eugene Thayer, a property adjoining our grounds on Meadowbrook Avenue. This consisted of a large and modern dwelling and nearly eight acres of land on which there was established a fine planting of interesting trees and shrubs. The house was later named "Thomas Soverign Gates Hall," in honor of the late president of the University, and into it were moved the administrative offices, herbarium, library, laboratories, and other activities which had formerly been located in the Morris Mansion. The Mansion is used at present only for lectures or scientific meetings.

The Arboretum is conveniently situated between Germantown and Stenton Avenues. It is bounded on the south by Hillcrest Avenue and delimited to the west and southwest by the Wissahickon Creek. As already indicated, the property as now constituted extends northward across Northwestern Avenue into Montgomery County and along its northwestern boundary it adjoins the grounds of the Whitemarsh Valley Country Club. It is open daily without admission fee from 9 a.m. until 5 p.m., and during the summer until 8 p.m.

THE ARBORETUM TODAY

Today the Morris Arboretum may be thought of as an outdoor museum, an assemblage of hardy trees and shrubs attractively arranged in beautiful surroundings. Here one may see most of the woody plants native to temperate

The Rose Garden is pleasantly located and well planted.

eastern North America often growing side by side with specimens from Europe, from our Pacific Northwest and, of course, from China and Japan. Especially noteworthy are fine examples of Oriental conifers, pines, firs, spruces, cypresses, junipers, arbor-vitaes and the recently discovered metasequoia or dawn redwood. Here are magnificent specimens of the true cedars of the Old World: the Atlas cedar from French North Africa, the cedar-of-Lebanon and the Deodar, native to the foothills of the Himalayas. Some of the finest yews to be found anywhere in the eastern states may be seen at the Arboretum.

As would be expected, particular attention has been devoted to the spectacular flowering trees and shrubs which glorify our spring and the visitor to the Arboretum will find here a profusion of forsythias, magnolias, dogwoods, hawthorns, cherries, crab-apples, lilacs.

Although many of the plantings conform to no systematic or ecological sequence, the groupings are thoughtfully arranged and the general effect is harmonious and pleasing. Broad open areas of grassland abound and serve to create an impression of spaciousness, as well as to provide a series of vantage points from which the mass plantings can be better seen and appreciated.

Special Collections

Among the paramount attractions of the Arboretum are several special collections, representing concentrations of many kinds or species of the same genus of plants. Outstanding among these are the hollies. Nearly seventy different species and varieties of holly may be seen on the slope leading down from the Administration Building. The collection contains a number of different forms of both English and American holly, a large variety of evergreen hollies from China, Korea and Japan, and several species of deciduous hollies, both native and exotic.

Another noteworthy collection is that consisting of about forty different kinds of boxwood. These are planted on an open space just above the Rose Garden, and visitors to the Arboretum tell us that it is one of the most complete representations of this group of plants found anywhere in this country.

Other collections of note include such groups as spiraeas, viburnums, barberries, English ivies, and many more.

However, of all special collections in the Arboretum the ones that attract the greatest attention and excite the most admiration are the Rose Garden and the several concentrations of rhododendrons and azaleas.

As rose gardens go, ours is but a small one, comprising only about an acre of land, and yet it lures more visitors than any other single feature of the Arboretum. This is partly because it is so beautifully located and so well laid out, but also because an effort is made to exhibit in it the finest varieties obtainable. The visitor can see here not only many of his favorites among the older varieties, but also the newer forms which have been developed in recent years. The Arboretum has been selected as one of the testing sites for new types

The Medicinal Plant Garden, made possible by the Founders' Fund Award of the Garden Club of America, is a recent feature.

of roses and every year receives novelties for evaluation before they are offered for sale by the dealers.

It also receives each season the winners of the American Rose Society's annual competition, so that the public can follow the latest developments in new roses.

The largest rhododendron planting is one which extends for several hundred feet along Germantown Avenue. Here, against a background of native hemlocks, one may see scores of the newer hybrids, many of them grown from seed obtained from the Royal Botanic Garden in Edinburgh.

Azalea Meadow, which lies near the foot of the slope leading down from Gates Hall, is planted mostly with Japanese hybrid azaleas. The riot of color put forth in mid-May by these plants is, again, something which beggars description.

New collections of other particular groups of plants are now being established and will eventually embrace such forms as lilacs, wisterias, forsythias, crab-apples, Glendale azaleas and others.

Bee Garden

In October, 1951, there was dedicated, with fitting exercises, the Lorenzo L. Langstroth Bee Garden in honor of the Philadelphia clergyman who, approximately a hundred years before, had made so many notable contributions to the theory and practice of beekeeping. This garden, which is under the able curatorship of Fred W. Schwoebel, an eminent amateur apiarist, contains most of the important trees and shrubs which are visited by bees in pursuit of nectar. Its collections are being augmented each year in an effort to have in it a truly comprehensive representation of bee-plants.

Medicinal Plant Garden

One of the most recent special features developed at the Arboretum is a garden containing the important drug plants of the world. The garden was made possible by the Founder's Fund Award of the Garden Club of America. In this collection the visitor may see growing during the summer months not only the familiar hardy drug species such as digitalis, aconite, valerian, and witch-hazel, but also many tropical species including nux-vomica, belladonna, camphor, quinine, eucalyptus and the rauwolfias, which are today one of the principal sources of tranquilizers.

Woodlands

One of the most attractive sections of the Arboretum is the heavily wooded slope along the Wissahickon Creek. Here natural conditions have been permitted to prevail and the native hemlock is the dominant species, interspersed with a number of deciduous trees and shrubs. Due to the steepness of the slope and the dense undergrowth, this region had long been inaccessible. Recently, however, a series of carefully graded trails, with occasional flights of steps, has been developed, thus enabling visitors to enjoy the beauty of this area. The bird lover will find this a fine region in which to observe the spring migration as well as to study our summer residents.

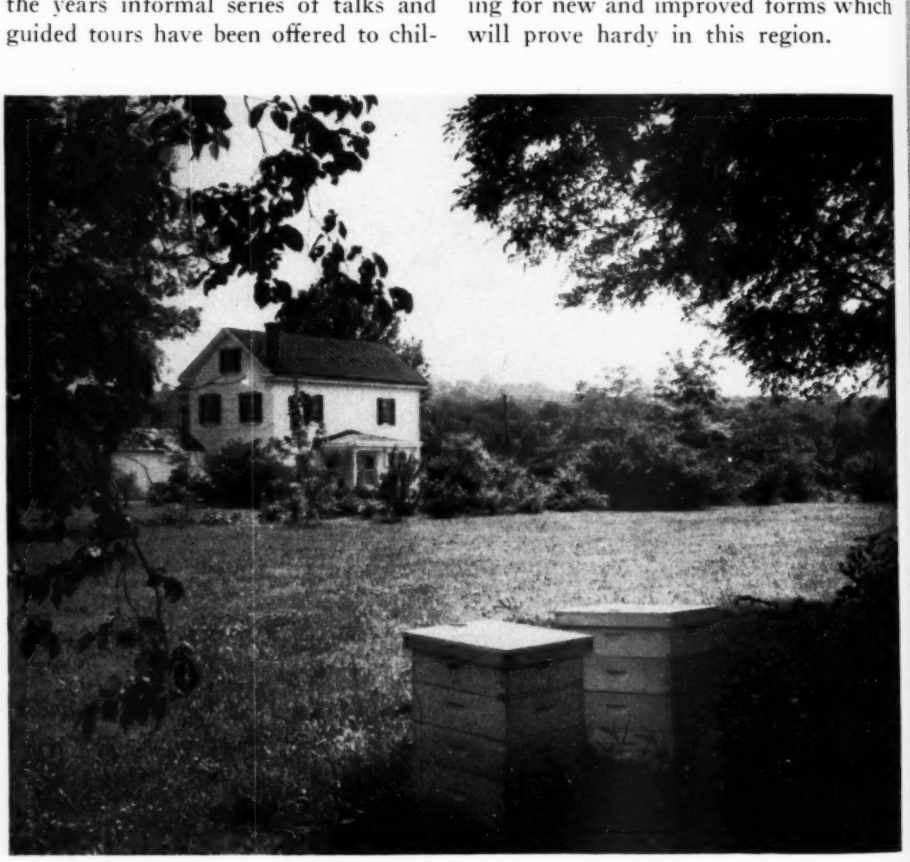
Educational Activities

One of Miss Morris's stipulations was that an educational program should be developed at the Arboretum. Over the years informal series of talks and guided tours have been offered to children and adults. Groups of scouts, nature-study organizations and school classes have been encouraged to visit the Arboretum to receive instruction. Garden clubs frequently schedule visits to the grounds to study and enjoy some special collection or to witness demonstrations of some practical aspect of horticulture.

Beginning in 1955, the Director, aided by members of his staff, has offered each summer a six-weeks college level course on woody ornamentals. This class is attended by landscape architects, high-school teachers, and students majoring in botany at nearby colleges and universities.

Scientific Work

One of the functions of an arboretum is to carry on research dealing with problems of woody plants, especially ornamental trees and shrubs. In our desire to increase the variety of material grown here, it is necessary to select and test many strains before setting them out on the grounds. This is done by a variety of methods which involve the use of such facilities as greenhouses, coldframes, nurseries and a slat-house. Also, by such techniques as hybridizing and grafting, we are constantly searching for new and improved forms which will prove hardy in this region.



Eventually the Langstroth Bee Garden will comprise a representative collection of bee-plants.

The Fernery is an attractive indoor planting at the Morris Arboretum.

One of the large-scale research projects in operation at the Arboretum is the Michaux Quercetum, supported in part by a grant from the American Philosophical Society and carried on with the cooperation of the staff of the Northeast Forest Experiment Station, which occupies space in Gates Hall. This undertaking involves the growing of thousands of oak seedlings from many states and several foreign countries. Nearly fifty different species are represented in this experiment, the objective of which is to provide us with new information concerning such factors as hardiness, rapidity of growth, resistance to disease, and so on.

The breeding of forest trees is another project of considerable significance, and work of this nature is being prosecuted at the Arboretum under the direction of a group of tree geneticists attached to the Forest Experiment Station. Already improved strains of certain types of trees have been developed and as work along a number of lines continues, other important advances may be expected.

Scientific work of this nature, in addition to greenhouses and nurseries, requires laboratories, a library, and a herbarium, the last named being a collection of pressed, dried and mounted plants for purposes of comparative study and identification. In Gates Hall on Meadowbrook Avenue will be found several well-equipped laboratories (including a dark room), a library composed of more than twenty-five hundred volumes and many standard periodicals, and an herbarium containing about forty thousand specimens of woody plants from all over the world.

Publications

Miss Morris specifically desired that there should be developed at the Arboretum some means of disseminating information concerning plants. To this end the Morris Arboretum Bulletin was inaugurated in 1935 and appeared somewhat sporadically for some years. It is now on a definite quarterly schedule and carries articles of both a scientific and a semi-popular nature. It also contains information about activities in progress at the Arboretum and calls attention to seasonal exhibits or collections of outstanding interest.

Of a somewhat more scholarly nature is a series known as the Morris Arboretum Monographs which appear from time to time. The most recent publication in this series is The Genus Phlox by Dr. Edgar T. Wherry, Emeritus Professor of Botany at the University of Pennsylvania and for many years a member of the scientific staff of the Arboretum. Dr. Wherry is an acknowledged authority on this interesting genus of plants and his volume, the result of a quarter of a century of study, has been acclaimed by gardeners, botanists and plant lovers.

Raising from Seed Large-flowered CLEMATIS

By Faris M. Blair

Reprinted with permission from the Fall 1956 Arboretum Bulletin, published quarterly by University of Washington Arboretum Foundation.

There are many varieties of large-flowered clematis in commerce. Most of them have very beautiful individual blooms, and many make a very pleasing show when allowed to develop into large vines. Continuous bloom is not to be expected, as each variety seems to choose its own time for greatest show. Some varieties have a second period of scattered bloom. They vary in their response to pruning so that it is necessary to learn how to manage each variety.

I had the varieties 'Ramona' and 'Jackmanii' in my yard for many years and derived much pleasure from them. 'Jackmanii' is a deep purple that begins to bloom in late June or early July. It is very convenient to manage 'Jackmanii,' because it can be pruned to the ground in winter so that you can get rid of as much of the vine as necessity calls for, and then a very vigorous growth develops and blooms as stated. This is probably the variety that is seen more than any other; it is one of the oldest (1860) and perhaps most dependable for the general nursery trade. It is seen often in the city and makes a particularly pretty picture growing beside a white house on a farm. 'Ramona' has a larger flower than 'Jackmanii;' the color is mauve or deep blue with dark stamens and antlers, but the color varies with the season and other conditions. It is a vigorous plant, and the blooms usually evoke remarks of admiration.

As my acquaintance with clematis varieties increased I began to add to my collection. The most striking of the lot is a very large pure white that usually measures between six and seven inches in diameter, sometimes a little more. In the past, names got juggled around and changed to suit the whim or avarice of the nursery selling a plant, and sometimes, mistakes were honestly

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A VISIT TO PARADISE

(Horticultural, That Is)

By **Wellington F. Scott, Jr.**

Protea cyanaroides.

THE First World Orchid Conference was held in St. Louis in the fall of 1954, and at that time a second conference was scheduled for the fall of 1957, in Hawaii. It was our planning to attend this second conference which started a series of decisions resulting in a circuit of the entire Pacific area, from Tokyo, Hong Kong, the Philippines and Bangkok to Australia, Tasmania, New Zealand and Fiji.

Once a decision has been made to visit one spot, it is easy to include just one more because it looks so close on the map. New Zealand, of course, does not look very close to anywhere, but we were invited to go there to address the New Zealand Iris Society on the occasion of its annual meeting.

New Zealand has two main islands which stretch from north to south for more than a thousand miles. When it is considered that Christchurch, South Island, is four hours by air from McMurdo Sound, Antarctica, and that Auckland, North Island, is four hours from Fiji, you begin to realize what a tremendous spread in climates is experienced by these islands. North Island is a veritable horticulturist's paradise, with its moderate climate tempered by surrounding seas.

The native flora of New Zealand is interesting enough to the botanist, but the horticulturist finds much to be desired. There are few spectacular natives, though the glittering beauty of the "Pohutukawa" denies this immediately. This tree blooms in December and appears covered with glistening blood-red flowers. One of the myrtle family *(Metrosideros tomentosa)*, it is indeed startling in its splendor.

The gardens of New Zealand are lush with beauty gathered from all over the world. The strange plants of South Africa and Australia do as well here as in their native habitats. Perhaps better. *Banksia, Protea,* and *Leucospermum* are to be found in abundance. *Grevillia* and *Boronia* of Australia have been selected and improved until they are garden subjects of great beauty.

Near the North Island city of New Plymouth is a most remarkable collection of rhododendrons. Here has been formed what is called the Pukeiti Rhododendron Trust, the purpose of which is to bring into one spot a specimen of every rhododendron in the world. This most ambitious venture is headed by Russell Matthews, and one day of listening to him convinced us that here would some day be found every kind of rhododendron in the world. The considerable acreage owned by the Trust is on the lower slopes of Mt. Egmont, which rivals Fijiyama in the perfection of its snow-capped volcanic cone. Here virgin "bush" is being cleared as the plantings expand. Giant rimus *(Dacrydium cupressinum)* and iron-hard ratas *(Metrosideros robusta)* must be dragged from entangling vines and disposed of. One day (and it will be of another generation) Pukeiti will be a beautiful monument to the energy and planning of its Trustees.

Looks like a Joshua tree — but is *Cordyline australis.*

But this is wandering from the main purpose of our visit to New Zealand. We went to attend the annual meeting of the New Zealand Iris Society, which was held in the friendly city of Gisborne, on the east coast of North Island. Though friendly, Gisborne is quite puzzling to the visitor. It is cut by several tidal rivers, and there are many traffic bridges which all look alike. No sooner have you digested the information that a person lives "across the bridge and two streets to the left" then you find the information worthless, for you do not know which bridge.

Iris gardens in New Zealand are just about like iris gardens here, with one exception — the perfection of growth. We went to New Zealand expecting to see mostly iris varieties of English origin and very few American varieties. Quite the opposite proved true. We saw very few English varieties and all of the newest and best American varieties, grown to perfection. The gardens themselves ranged from tiny, intimate backyard borders to large informal collections spread over acres of ground. Though we went to look at irises, we found ourselves continually distracted by other "familiar" plants. We grow a few roses. We know 'Peace,' or so we thought. However, we saw planting after planting of 'Peace' with blossoms measuring (actually measuring) six inches across. When queried about them, the modest New Zealanders would say, "Oh, but they're just ordinary!" and so they were, for New Zealand.

The iris meeting closed with a flower show, sponsored by the Poverty Bay Horticultural Society. The night before the show we visited the hall, where it was to be held, and felt right at home. This was just like the night before a flower show anywhere in the world! Complete and utter confusion on all sides! No one could find anything. People ran hither and yon, each clutching a handful of flowers or a container of some sort, and with a wild look in his

eyes. But like all other flower shows, order came out of chaos and the signal for judging found the floor cleared (well, almost) and the hall a thing of beauty.

Some idea of the climate can be gained from a partial list of the plants and fruits displayed at this show. All had been grown in the immediate area. In one quick walk around the hall we noted roses, watsonias, gerberas, carnations, dianthus, heuchera, daisies, gladiolus, weigelia, primulas, geraniums, campanulas, stock, delphinium, lilies, pansies, tritonia, sweet peas, penstemon, nemesias, ixias, tulips, morphixias, rhododendrons, azuretum, philadelphicus, echiums, verbenas, mesembryanthemums, citrus fruits, avocados, cherimoyas, and, of course, irises.

The iris display was large and varied, though the high winds of the previous few days reduced the overall quality of the exhibits. I judged the iris section and found myself in a most embarrassing position. The outstanding iris stalk in the show was one I had no difficulty identifying. It was 'Bellerive,' a huge soft cream, originated by my close friend, Clifford Benson, right here in St. Louis. It was beyond question the best stalk in the show. But further to complicate matters, I discovered that it was exhibited by our hostess, Mrs. George Emms. And as if that were not enough, the trophy which I later awarded was the Mollie Emms Trophy! As long as we were in New Zealand, we could hear the laughter which went with the awarding of that trophy!

New Zealand Iris Society members visit the garden of Mr. and Mrs. George Emms, Gisborne.

A scene in the Botanical Garden, Gisborne, North Island, New Zealand.

Following the iris meeting, we went to Wanganui to visit Mr. and Mrs. Wally Stevens, who live atop a high hill overlooking the Tasman Sea. We wanted to see the oncoming results of Jean Stevens' attempts to breed a pink amoena. Should there be a reader who does not grow irises (perish the thought!) it must be explained that an amoena is an iris which has white standards and colored falls. The old variety 'Wabash' is one of the best known amoenas. Some years ago, Jean Stevens created a variety named 'Pinnacle,' with standards of an unusual opaque white and falls of primrose-yellow. Now she is perfecting varieties with the same white standards and pink falls.

Pink amoenas of sufficiently good quality to meet her exacting requirements may be on the market in another five years. Perhaps sooner. She has dozens of them in her seedling patches, but they are not finished flowers. Only stepping stones.

On the steeper portions of Bastia Hill, Mr. Stevens grows a remarkable collection of rare plants. My own estimate of the situation is that he is an inveterate collector, but in order to justify the extent of his fascinating hobby he markets some of the more spectacular blossoms. We saw *Craspedia globosa, Banksia caleyi, Leucospermum reflexum, L. bolusii* and *L. catherinae, Eucalyptus lehmannii* and *E. preissiana*, to name the more unusual.

The beds and borders around the Stevens' home were a flower photographer's dream, and we were completely fascinated by the unusual speci-

Mrs. Scott and Carl Teschner examine small rock garden plants in the latter's garden, Dunedin, South Island.

In the distance is the active volcano "Ngaurahoe" near the center of North Island.

mens. One thing which caught our eye was an Australian native, *Anigozanthos manglesii.* This is one of a small group (only seven, I think) called "kangaroo paws" because of their fancied resemblance to a kangaroo paw. This particular one has a blossom of metallic green trimmed in metallic crimson and looks like nothing else on earth.

We left the Stevens' garden with regret and were not to see another so unusual until we reached Dunedin, on South Island. The city of Dunedin is itself quite a story. Settled by Scots, named for Edinburgh, it is today more Scottish than most of Scotland. Moreover, it is the only city I know where an automobile driver can make five right-hand turns without returning to his starting point. A map of the city finally explained this phenomenon; it is laid out in concentric pentagons about the cathedral.

In Dunedin we visited Carl Teschner, another extraordinary plant collector. The climate is different, for Dunedin is several hundred miles south of Wanganui, and it faces a different and colder sea. The Teschner garden is in a small bowl-shaped area, covering perhaps an acre and a half. It is terraced, with steps joining the various levels, and faces northwesterly toward the warm sun. A small stream trickles down the bowl to a pool.

Here we saw small plants, plants for the rockery and the stream border. One striking plant was a mimulus, a variety called 'Whitcroft's Scarlet.' There were numerous varieties of creeping phlox and of dwarf irises. Two complete strangers to us were *Roscoa hummeana* and *R. cautleoides*, dainty plants with iris-like foliage and orchid-like blossoms on eight-inch stems. Here also we saw our first plant of *Iris gracilipes alba,* thriving in a large clump, with blossoms like white butterflies. We could have spent days in the Teschner garden, but threatening floods (they later proved to be record floods) were hurrying us, so we left with promises to return.

We were in New Zealand a month, and now we realize that an entire year would not be sufficient to explore its beauty spots and know its wonderful people. Of course, we visited the usual vacation spots, all but one. One of our "must see" places was Milford Sound, near the tip of South Island, where the scenery excels that of the fjords of Norway. Eleven inches of rain in one day made the road to Milford quite hazardous, and a veritable river coursed through the Homer Tunnel. We got within ten miles of Milford Sound, to be turned back by the forbidding tunnel. But we shall try again.

Leucospermum reflexum.

On South Island there are glaciers which go down to the sea, with tree ferns and other tropical growth flourishing at their very feet. There are waterfalls which tumble entirely free for many times the height of Niagara. There are forests where supposedly extinct birds still live. Who knows? In some remote crevice of South Island someone may yet find a live Moa!

North Island has thermal areas with geysers, hot springs, and multi-colored pools and terraces. It has active volcanoes with cones rivaling any in the world. It has caves with glow-worms clinging to the roof, to make a twinkling sky of the limestone vault. It has—oh, we'd better stop. This sounds too much like a travel folder!

We went to New Zealand to see flowers, and flowers we saw, in magnificent profusion. We also saw wonderful people and wonderful scenery. Some day we shall return.

RAISING CLEMATIS (from page 11)

made. The first one of these choice whites that I saw was named 'Marie Boisselot.' When I learned this, I began a search for a place to buy it but was not successful because the nurseries contacted had been in the habit of importing their plants. The war was on and it was not possible to import plants. On my way to and from work, I noticed a beautiful white clematis in a yard, and in time developed enough courage to inquire about it. The man did not know the name of the plant but offered to sell it to me. A plant, said to be 'Marie Boisselot' was given to me. I bought *lanuginosa candida* from an eastern nursery and, a couple of years ago, 'Madame Le Coultre,' which had once been recommended by Layritz' nursery as the best white. These plants from four different sources with three different names have the same habit of

growth and time of blooming; the blooms are so much alike that I am not able to tell the difference. 'Marie Boisselot' is a good name, so I shall use it.

All of these large white clematis form many good seeds, about seventy-five to a cluster. The seed is much the shape of a flat arrowhead that has a feathery tail about two and three-eighths inches long and a slightly spiral shape. This tail is an elongated style. The seeds are attached to a central pad, the botanical name of which I do not know, and the tails radiate in a spiral from that central area. When ripe the cluster of seeds has the appearance of a white pompon. In some varieties the embryo does not fill out and is a small, shriveled imitation of a seed, though the feathery tail may be formed. At times, one seed that looks good may form among the ones that seem empty. In some varieties, as in the white one, most of the seeds appear plump and viable.

I had felt that the usual clematis seeds would not be likely to germinate and had made no effort to raise seedlings, until I found volunteer seedlings growing in various places around the yard. I tried to transplant the volunteers but had very little success in getting them to live. I then allowed them to develop where they were growing, until the plants had become large enough to tolerate the interference. It is possible that any one seedling might produce a variety that is worthwhile, and again, it might be worthless. Of course, we would not have hybrid plants if seeds had not germinated; yet a hybrid may be sterile. Having found that volunteers would appear, I followed the clue and sowed seeds of the one named 'Marie Boisselot.' I did this as soon as I could after the seeds were ripe in the fall. I packed them into a pot of sterilized soil, covered it with copper window-screen wire to discourage slugs, birds and other meddlers, and sank the pot in a bank just a few feet east of my house. I let Nature take her course except when water was needed. I watched for seedlings through the spring and summer, but none appeared until late September or early October. They then began to come up in abundance, looking much like miniature asparagus shoots. I did not disturb the seedlings until Thanksgiving when I put the pot into the small greenhouse. The seedlings were pushing up through the wire screen, so I removed the wire and damaged some of the seedlings. After a time most of the seedlings dampened off and the pot was put outdoors again. Several plants developed, but I lost track of them.

The above experience led me to sow the same kind of seeds in a small flat when the following season's crop was ripe in the fall. The flat was left out in the open. No seedling appeared until early the following fall when many of them began to show. Some of them made a vine several inches long with multiple fleshy roots radiating from the center, much like a mature clematis plant; these I potted in December. Most of the other seedlings had only one long straight root like a tap root. After potting as many as I could, I packed the remaining multitude of seedlings back into the flat. The final result was a disappointment, for most of them passed out in spite of loving, if misdirected care.

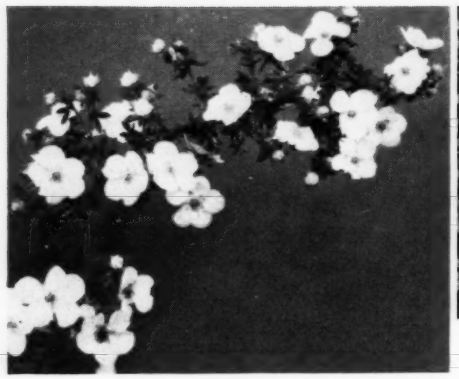
Clematis seedling No. 13 in the Seattle garden of Dr. Faris Blair. The flowers of palest lavender measure four and a half inches in diameter.

The following year I collected seeds again in the fall when they were ripe, but this time I collected from several different varieties and kept each variety separate until I could take time to plant them. I put each variety in a separate paper bag and labeled each bag carefully. As nature tends to plant seeds as soon as they are ripe, that could be a guide. I do not know how long clematis seeds can be kept. If the seeds are not gathered as soon as ripe, the wind and rain will tear them loose and blow them away. They could then lodge in loose material and wiggle their way down into a place where they could germinate. I have watched the seed wiggle and twist as the wind blew on that feathery tail and worked its way deeper and deeper into loose material. The seeds picked this time were from 'Prinz Hendrik,' 'Comtesse de Bouchaud' and a hybrid bought from the Swiss Floral Company of Portland. I planted these in separate labeled pots on January 1, 1952, and kept them in the greenhouse; there was no germination until November 23.

The progress of these seedlings was rapid and satisfactory. One of them, from a group of 'Prinz Hendrik' seedlings, had several blooms in the spring of 1953. Several others from the same group bloomed soon after and all resembled the parent, but were not exact duplicates. After the second winter in the greenhouse, I planted the mass of 'Prinz Hendrik' seedlings in the ground to develop naturally. This was in the spring of 1955. Although these plants grew well during the summer and fall, the severe freeze beginning on Armistice Day, together with other cold spells, killed them to the ground level. After a slow start in the opening spring of 1956 these plants grew rapidly, are now over six feet tall, and have a number of lovely blooms.

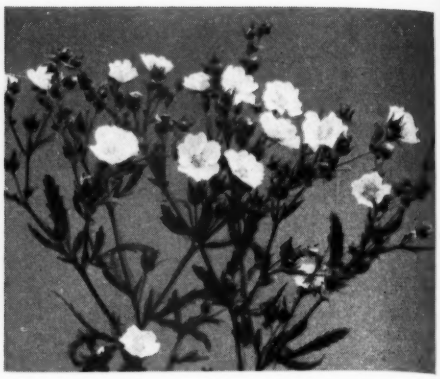
In the fall of 1954 I collected seeds from thirteen varieties of clematis and kept them in paper bags outdoors, until I could take time to plant them on January 15, 1955. I planted them in separate labeled pots and put the pots outside on a board close to the south side of my house. They were left there until April 3 when they were put into the greenhouse. They were carefully watered during the period outdoors as well as in the greenhouse. There was no evidence of germination until August 20, 1955, when one seedling of 'Jackmanii Superba' appeared. Following that there was good germination in all of the pots, except three which showed none. The growth of most of these seedlings was satisfactory. The contents of all of the pots containing seedlings were planted outdoors on April 29, 1956, keeping the contents of each pot intact and disturbing the roots as little as possible. Each group was planted in a separate prepared location. At this time there are several rather pretty blooms.

(Continued on page 29)



Potentilla sulphurascens var. *Vilmoriniana*

Geranium grandiflorum Gravetye var.



Potentilla recta var. *Warrenii*

PLANTS FROM GREAT BRITAIN

By **T. H. Everett**

In 1952, under the patronage of the Garden Club of America, which made its Founders' Fund Award available for the purpose, and the Garden Clubs of Lenox, Massachusetts and Millbrook, New York, I visited Great Britain for the purpose of seeking and bringing back plants that might prove worthwhile in American gardens and in botanical plant collections of the United States. As a result of this search I secured and brought back two hundred and eighty-two different kinds of plants. Many of these were distributed to gardens and individuals in various parts of the United States. The notes that follow refer to some that are growing at The New York Botanical Garden. Illustrations and discussions of others will be presented in the next issue of THE GARDEN JOURNAL OF THE NEW YORK BOTANICAL GARDEN.

Potentilla sulphurascens variety Vilmoriniana seems to be the correct name of the splendid hardy deciduous shrub previously known as *Potentilla fruticosa* variety *Vilmoriniana*. It was first described in France in 1910 but, like most shrubby cinquefoils, has received little or no attention in the United States. This hybrid *(P. arbuscula* x *P. glabra mandshurica)* has the great merits of being extremely hardy, of thriving in a variety of soils, of being attractive in form, foliage and flower, of freedom from pests and diseases, of blooming almost continuously from early summer until frost and of being easy to propagate.

Potentilla sulphurascens variety *Vilmoriniana* grows two feet or slightly more high, is densely branched and well furnished with small silvery leaves which provide a perfect foil for its profusion of inch-wide, soft sulphur-yellow flowers, each of which superficially resembles a single rose. This small shrub requires full sun.

Ranunculus Ficaria var. *cuprea*

Geranium grandiflorum Gravetye variety has proved excellent at The New York Botanical Garden. It is of tidy habit and blooms well in early summer and over a long period. It is a hardy herbaceous perennial, decidedly superior to the typical *Geranium grandiflorum*, from which it differs in having finer foliage and more substantial bowl-shaped flowers with broader petals. Each flower measures two inches across, is a glorious purple-blue prominently veined with purple and has a small white eye. This geranium grows about a foot high which seems to preclude the possibility, which some have suggested, that the Gravetye variety is synonymous with *Geranium grandiflorum alpinum*, described as being a dwarf variety.

Geranium grandiflorum Gravetye variety is easily propagated by division. It grows in any well-drained, fertile soil and prospers in full sun, although its flowers seem to be of somewhat better color when the plant is located where it receives a little shade from the fiercest sun.

Potentilla recta variety Warrenii is the correct name of the handsome plant which has been known to horti-

culturists as *Potentilla Warrensii.* It is an excellent hardy, herbaceous perennial, superior for garden use to the typical *Potentilla recta* and other variations of that species I have seen. It has been in cultivation since the early 1920's and has been described, probably mistakenly, as a hybrid. This plant breeds true from seeds which it produces abundantly. A great virtue is its habit of continuous bloom from early summer until after killing frost; its main flush of bloom is in June.

This potentilla grows two feet high and has broad, loose heads of clear buttercup-yellow flowers, each with a slightly darker eye. The flowers measure one and a half inches across. They contrast well with the bright green foliage. *Potentilla recta* variety *Warrenii* thrives in any ordinary soil in full sun.

Ranunculus Ficaria variety cuprea is a distinct and pleasing variation of the golden-yellow-flowered European lesser celandine. It is quite hardy and grows and flowers well in moist soil in light shade. A spring bloomer, its foliage dies completely as soon as it is through flowering and nothing more is seen of the plant until very early the following spring. It summers and winters as dormant tubers.

Growing but a few inches high, this plant forms in spring a carpet of shiny, heart-shaped green leaves bespangled with starry, upturned, deep coppery gold flowers so shiny that they appear to have been varnished. The flowers are about one inch in diameter.

Ranunculus Ficaria variety *cuprea* seems not to have been noticed in horticultural literature, although I am suspicious that Robinson's comment in the ENGLISH FLOWER GARDEN about an "especially fine single rich orange" variety of *Ranunculus Ficaria* refers to our plant. Propagation is by separation of the tubers at about the time the foliage dies down.

Aralia elata variety albo-marginata is one of the most handsome of the variegated-leaved trees or shrubs. The foliage pictured is that of a specimen which, since it was brought from England in 1952, has been growing outdoors at The New York Botanical Garden. Each year it has produced a plentitude of great bipinnate leaves, tropical in appearance, bold in effect, in color green generously margined with creamy white.

This variety of a Chinese species, like its near relative the American *Aralia spinosa,* (Hercules' club) thrives in any moderately good soil in full sun. Because it must be propagated by grafting on to understocks of a green-leaved kind *(A. elata* or *A. spinosa)* a regular cultural detail consists of removing promptly any green-leaved sucker shoots which develop from around the base of the plant.

Houttynia cordata has surprised me. I really had not expected that it would prove hardy at New York, yet for five winters it has survived outdoors without sign of damage and has spread and prospered. It is surely a most excellent addition to the list of available ground-covers and should, I believe, become increasingly popular as it becomes better known and its value is more widely recognized.

A Japanese species, this plant attains a height of nine to twelve inches. It spreads by underground runners and sends up numerous, erect, somewhat zig-zag stems each clothed with heart-shaped leaves. From the upper leaf axils successional flowers are borne so

Close-up of inflorescence of *Houttynia cordata.*

Aralia elata var. *albo-marginata*

Houttynia cordata

Nautilocalyx Lynchii

that a display is maintained for many weeks during the summer and fall. Technically, the inflorescences are similar in a gross way to those of our flowering dogwood and they remind one of the blooms of that native tree. Actually, the tiny individual true flowers that form the central erect spike of each individual inflorescence are quite different in their botanical characters from those of *Cornus*; they are much more like those of the lizard's tail, *Saururus cernuus*, and those of pipers and peperomias. An inflorescence of houttynia consists of an erect, dense spike of tiny greenish flowers surrounded at its base by four spreading, white petaloid bracts as is the case with *Cornus florida*. The bracts form the showy part of the inflorescence.

Houttynia cordata grows freely in any reasonably fertile, moderately moist soil in sun or light shade. It is very easily propagated by divisions and by cuttings. In winter the stems die to the ground. The new shoots appear rather late in spring.

Nautilocalyx Lynchii is a handsome member of the presently horticulturally popular family, the *Gesneriaceae*, the group of plants to which belong African violets, gloxinias and streptocarpuses. Unlike those, the chief interest in the nautilocalyx lies in its attractive foliage rather than its flowers, although the latter are not without a certain modest beauty.

Nautilocalyx Lynchii is probably a native of Colombia. It grows about two feet high and has rich maroon-purple or brown-purple, shiny leaves with conspicuously sunken veins. Its pale yellow, tubular flowers are more or less hidden by the beautiful foliage.

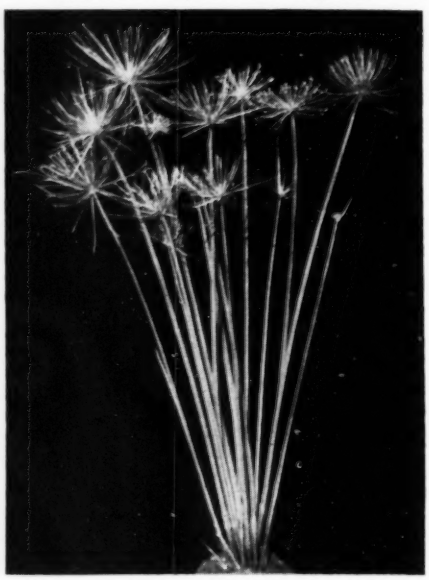
Globba Winitii

This plant is best suited for cultivation in humid tropical greenhouses or in terrariums, but in favored locations it may succeed as a window garden plant. It needs a rich soil that contains much organic matter and is well drained but kept in an always moist condition. Propagation is easily accomplished by stem cuttings and by single-leaf cuttings.

Globba Winitii is decidedly a newcomer among tropical plants. It was first discovered in 1924 growing along moist, shady streamsides in northwestern Siam. The following year living specimens were sent to the Royal Botanic Gardens, Kew, England where it has bloomed annually since. So far as is known, the 1952 introduction by The New York Botanical Garden and The Garden Club of America represented the first appearance of this plant in the cultivated flora of the United States. *Globba Winitii* was first described as a new species in 1926 and was named in honor of its discoverer, Phya Winit Wanadorn, a Siamese forestry officer and an enthusiastic collector of plants.

Since its introduction to The New York Botanical Garden, this species has prospered and flowered each year as a pot plant in a tropical greenhouse. It blooms in late summer and fall and remains attractive, in flower and later in fruit, for an extended period. *Globba Winitii* belongs in the botanical family Zingiberaceae and grows about two feet high. Its flowers are deep yellow, curiously shaped and in graceful, drooping panicles. They are subtended by pinkish bracts. A rich, moist soil suits this Globba well. The plant is easily propagated by division.

Cyperus Haspan var. *viviparus*



Cyperus Haspan variety viviparus is rarely mentioned in botanical or horticultural literature; the only reference to it I have found is in WATER GARDENING by Frances Perry. Gardening dictionaries and encyclopedias seem to ignore it. Seemingly, it is new to the American trade. Yet it is a fine decorative subject, useful alike for growing as an indoor pot plant and for planting outdoors in frostfree and nearly frostfree areas.

This kind has the general appearance of a miniature papyrus, *Cyperus Papyrus*. It produces numerous, graceful, erect green stems two feet or less high, each topped with a globular or semiglobular mop head of slender bright green strands or filaments and measuring three or four inches in diameter.

I have not seen flowers or seeds on this plant, and I am inclined to believe that it is sterile. Propagation is readily effected by bending the stems over so that the mop heads are brought into contact and kept in contact with water. Alternatively, the mature mops may be cut off with an inch of stem attached and floated on water until they root and begin to send up new shoots.

Cyperus Haspan variety *viviparus* thrives in sun or light shade. It requires a rich soil maintained in an always wet condition. It grows well when its pot is partly or completely submerged or is kept standing in a saucer of water.

Buddleia crispa, a native of the western Himalayas, is an old plant in

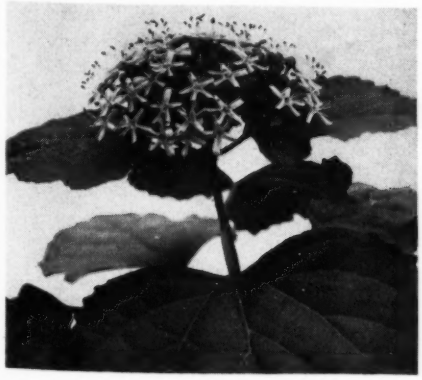
cultivation although apparently, known scarcely or not at all in the United States. It is not listed as being offered for sale by any of the nurseries listed in either the fifth or sixth editions of the PLANT BUYER'S GUIDE. Rehder, in his MANUAL OF CULTIVATED TREES AND SHRUBS, suggests that it is hardy only in zone 7, the northern limits in the eastern states of which are Cape May, the Delaware-Maryland-Virginia peninsula, Richmond, Virginia and southern Kentucky and Nashville, Tennessee.

I am reasonably certain that in well-sheltered locations it will survive and prosper north of those limits, surely to Washington, D. C., and possibly even as far as Long Island, but that is a matter for trial. Certainly, *Buddleia crispa* should prove an outstandingly good shrub for gardens in most parts of the Pacific Coast and in many parts of the Southwest. In addition, it is a splendid summer-flowering kind for growing in large pots or tubs for outdoor porch and terrace decoration. During the winter, such specimens may be stored in a light cool cellar or other place that would be suited for wintering over bay trees and the like.

Buddleia crispa is a much-branched shrub with a conspicuous covering of whitish or tawny, woolly or felt-like hairs on its younger stems and leaf stalks. The leaves, especially the younger ones, and most particularly the under leaf surfaces, are densely tomentose.

The flowers of *Buddleia crispa* are wonderfully fragrant. They are lilac in color, each with a small white eye and yellow throat. They are arranged in dense panicles which are shorter and more stubby than those of the common butterfly bush, *Buddleia Davidii*, but they make a great show because of their profusion. The flower color blends most pleasingly with the over-all whitish gray-green appearance of the stems and foliage. This shrub needs free soil drainage and full sun; otherwise it has no special cultural needs.

Clerodendron Bungei (C. foetidum)



Gloriosa superba variety lutea is the name under which I acquired in England a truly lovely kind of this glory-lily. It may not be correctly identified. The authorities at Kew told me that they believed the plant was possibly an undescribed species of *Gloriosa*, and I have a distinct recollection of having seen something published about that since my return from England, but a fairly extensive search in our library has failed to reveal any such reference, if indeed such exists. This plant is undoubtedly the one of which Bailey says "A yellow-flowered form of unknown origin has been described as *G. lutea*, Hort; it is scarcely known outside of Kew."

The plant we have resembles in general appearance the well known *Gloriosa superba*, but its flowers are pale yellow deepening in color as they age, but without any trace of red. They measure from four to six inches across and the segments are distinctly crisped. They are borne profusely.

Gloriosa superba var. lutea

The culture of this kind differs in no way from that of *Gloriosa superba*. It thrives in rich, well-drained soil in a light tropical greenhouse where some shade from very strong sun is provided. Propagation is by division of the tubers.

Clerodendron Bungei (C. foetidum), a Chinese species, flourishes in a sheltered location outdoors at the Cambridge Botanic Gardens in England but whether it would survive outdoors in such a location in New York, I do not know. Probably not, yet who can say for certain without actual trial? In protected spots near the main Conservatory Range at The New York Botanical Garden such supposedly tender species as *Elaeagnus pungens, Magnolia grandiflora* and *Spartium junceum* have prospered for years. In any case, *Clerodendron Bungei* is well worth trying in such a location. We plan to do this.

Buddleia crispa

Since this species was brought to The New York Botanical Garden in 1952 it has been grown as a cool greenhouse pot plant and has made a handsome display of bloom in late summer. During the present season, it was especially good and there is no doubt that, in addition to its usefulness as an outdoor shrub in climates where it will survive, it has considerable potentialities for use as a tub plant for the decoration of greenhouses and outdoor terraces. When used for the last named purpose the plants could undoubtedly be wintered over successfully in a cool cellar, cold frame or some similar place.

Clerodendron Bungei blooms on current year's shoots; even though killed to the ground each winter it sends up strong new shoots from its base which flower the same season. Its fragrant, deep pink flowers are densely packed in hemispherical terminal heads, each four to five inches in diameter. The bold, heart-shaped leaves, emit an unpleasant odor if they are bruised. This plant appreciates a rich soil and full sun. It is easily increased by division and by cuttings.

TREE STRANGLERS IN THE TROPICAL FOREST

By H. A. Allard

SEVERAL SPECIES OF TREES occur in the tropical rain forest which have become killers of the largest forest trees. A number are found in the American tropics and may be seen everywhere in the superb original rain forests of Hispaniola. Some of these belong to the genus *Ficus* which includes the true figs. Others belong to the genus *Clusia* in the tropical family *Clusiaceae*, which taxonomically is closely related to the St. Johnswort Family, *Hypericaceae*.

Some botanists have included the genus *Ficus* in the nettle family, *Urticaceae*. Others have preferred to place some members of this family, including *Ficus*, in a separate family known as the *Moraceae*. In the former classification the genus *Ficus* is grouped with such familiar plants as elm *(Ulmus)*, hop *(Humulus)*, mulberry *(Morus)*, hackberry *(Celtis)*, hemp *(Cannabis)*, osage orange *(Machura)*, nettle *(Urtica)*, and others.

The genus *Ficus*, which includes the figs, is an important one in the warmer portions of the world and comprises many distinctive species. Among these are the common house plant known as the rubber plant *(Ficus elastica)*, *Ficus carica* which furnishes the edible figs of commerce, the famous Banyan tree *(Ficus benghalensis)*, and the Peepul tree *(Ficus religiosa)*, worshipped by the Hindus.

Many of the true figs are endowed with an inordinate growth energy which expresses itself in long pendant, rope-like branches. In some species these root readily when they reach the soil, as in the remarkable Banyan tree. *Ficus nitida*, a common shade tree planted in parks and along the streets in Ciudad Trujillo, has a similar growth habit. To keep these shapely and within bounds, these dangling vegetative ropes must be cut away from time to time.

One species of *Clusia*, namely *Clusia rosea*, Jacq. in the Dominican Republic and Haiti, is a ruthless destroyer of trees in the tropical rain forest. Once the little seedling has found a perch high up on some giant tree, it is in a position to destroy its host. Such trees, because they have afforded the seedlings a favorable start in life, are doomed to die. It is not by any conscious planning, for plants, as far as we know, have no consciousness comparable to animal mind, but is the result of a highly specialized phase of competition, quite unlike anything to be found in commonplace temperate-region forests.

If one wishes to indulge in anthropomorphic language, these stranglers are pitiless and selfish destroyers in forest society; they are in reality murderers in the forest world and use physical force to insure their own survival. These stranglers abstract no nutriment from their host; they merely perch high up upon their trunk or branches, and for a long time behave only as harmless, innocent epiphytes like thousands of ferns, orchids, bromeliads, and other innocuous plants of the tropical forest. These killers are insidious parasites in a physical rather than a physiological sense. Sooner or later they literally smother and squeeze their victims to death in many instances, at the same time robbing their foliage of light. How do they accomplish this? One day a bird perchance, after feeding upon a fruit, wiped its bill upon a twig or dropped a seed into a crotch or cavity of some forest giant where leaf debris and humus have accumulated. Perhaps it happened to lodge among some mosses, ferns and other harmless epiphytes on a branch where there was sufficient inorganic and organic material and moisture to initiate germination and sustain growth. As the little seedling grew, it dropped slender pendant branches downward toward the earth, now concentrating its growth largely in this direction. In time one of these long dangling rope-like talons reached the

Fig. 1. Strangler is perched high in the top of its tree victim and sends its rope-like strands to the ground where they will root in the soil, in a pasture near Piedra Blanca, Dominican Republic, West Indies.

ground and at once some stimulus activated root formation in the forest debris and soil. Perhaps the rooting impulse was favored by growth hormones which may be present in this material. Whatever the actual story, the little seedling perched high up on some forest tree is now enabled to abstract nutrients actually from the soil for the first time in its life. This is the first step in a change from an epiphytic to a terrestrial existence.

The entire plant now benefits by these newly acquired reserves of plant food, and increased growth, vigor and enlargement of stems and crown follow. It has become at least a self-sustaining plant of the good earth like any other plant, but it does not stop here. Other pendant branches continue to descend to earth everywhere around the trunk of the victimized tree, and an ever-increasing vigor of growth is promoted in the killer as these also reach the earth and become additional active absorbing organs. It continues to expand its crown above and to drop its dangling stems to earth from all its aerial parts. These crossing and recrossing branches enlarge, intertwine and anastomose by natural grafts until finally a cylinder of powerful branches has almost or even completely surrounded and embraced the unfortunate host tree, and it must inevitably die, literally in the powerful strangling, crushing arms of a ruthless enemy.

In the great tropical rain forests of Hispaniola one may find this tragic story of the strangling behavior in every stage of development, from the initial steps of germination to the complete destruction and disappearance of its host. In some instances only a dead, central cylinder of decaying wood is all that remains of its victim, and the ubiquitous termites help to remove this dead wood with further benefit to the strangler, which continues to enlarge its composite cylinder and fill the space with a huge false trunk of its own. In many instances nothing remains of the host, and the great strangler appears to stand innocently on its own gnarled trunk. Always, however, there has been the same story of ruthless physical embrace and death in its early life history in order to attain final success as a giant forest tree itself. It is an innocent bystander now, but it remains ever a potential menace to other forest trees through the agency of its fruit and seeds.

It is surprising how far from earth the little seedling can perch and yet drop its strangling ropes to the soil. Fig. 1 and Fig. 2 show a bundle of pendant aerial shoots perched on a limb that have descended from a plant fifty or sixty feet above the ground, and yet have reached and secured a firm hold in the soil some distance from the victim's bole. Cutting off the ends of these loose dangling or rooted strands does no harm to the killer, for it is merely stimulated to send out a horde of smaller strands from adventitious buds near the severed end. Fig. 3. In the mountains near Hato Mayor I saw a good-sized rope cut off about five feet ten inches from the ground. For a distance about three feet above the cut and down to the severed end, new adventitious roots had grown, and these had descended to the soil and rooted as a bundle of many strands. I counted one hundred and thirteen separate strands in this multiple structure, ranging from one-sixteenth to one-eighth inch in diameter. These strands will enlarge and fuse readily to form a powerful prop root in time. This illustrates the tremendous energy of growth and irrepressible vitality of this arch destroyer of trees in the forest.

Occasionally the strangler begins its life high up on a palm tree, and I have seen two such instances in Hispaniola where the royal palm was in the death grip of a *Clusia*. The story is somewhat different here where the endogenous type of stem is concerned. In the killer itself and in other broad-leaved trees of the exogenous class, the only actually living conducting portion of the trunk is a thin peripheral cylinder of cambium lying between the bark and wood, and this is progressively enlarging and dying within from year to year. It is much easier for the strangler to compress and destroy this thin peripheral layer of living cells with its tremendous

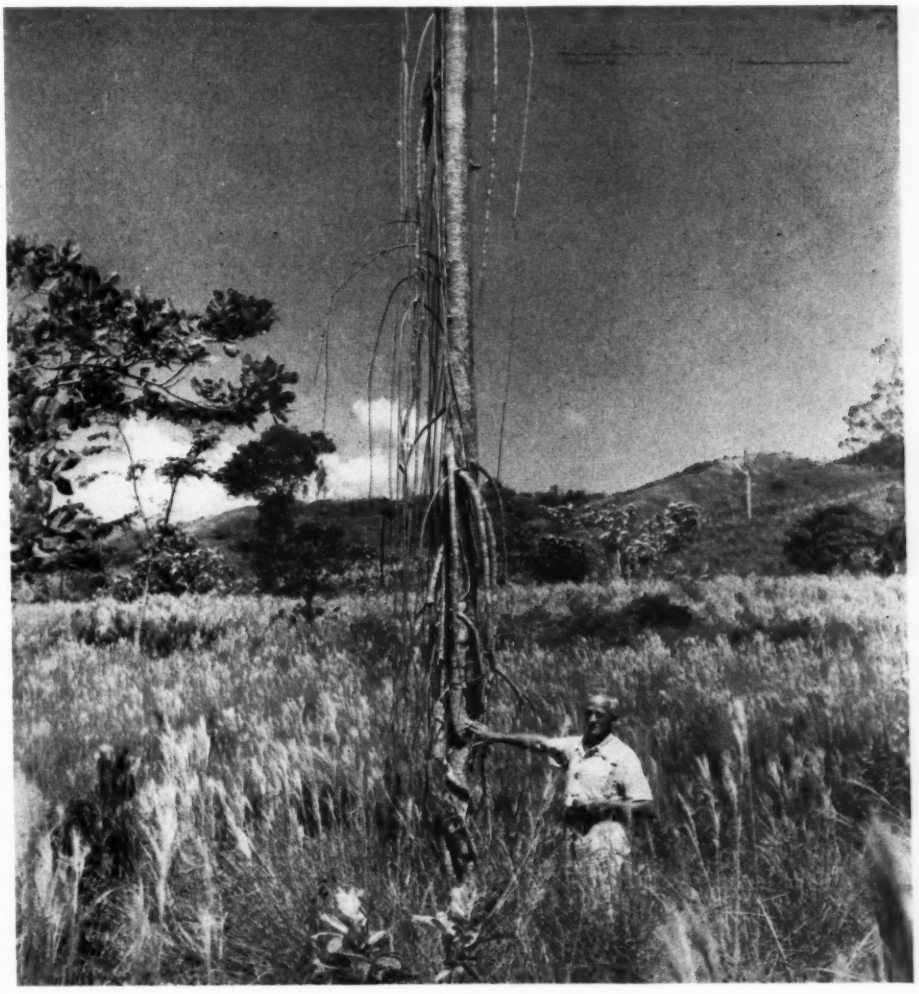


Fig. 2. Close-up view of Fig. 1 with the author showing the strands of strangler have reached the soil and rooted.

Fig. 3, left. Here is a strangler around a royal palm near Piedra Blanca, Dominican (Hispaniola) Republic, West Indies. The royal palm better resists the strangler's embraces. Fig. 4, below. The dangling stem of a strangler at a cave near Ciudad Trujillo, Dominican Republic, has been cut off seven or eight feet from the ground. Numerous strands have risen from the cut and are reaching for the ground.

compressive force than in the case of the palm. It is a common observation that one may seriously injure or kill a healthy growing exogenous tree such as oak or maple by winding bands of wire around the trunk.

The palm, on the other hand, with its endogenous stem structure does not confine its living, conducting tissues to a thin peripheral layer, but has these elements scattered from the center outward throughout its trunk. For this reason it is a simple matter to girdle and to kill the former by the axe or fire, whereas the palm cannot be girdled in this manner. I have seen thriving royal palms so deeply furrowed all around the base by fire that it looked as if they must eventually break off.

Fig. 5. *Clusia rosea* is choking a forest tree near Petionville, Haiti.

About the only way *Clusia* can strangle the royal palm, then, is by depriving its living crown and growing terminal bud of light. Near Piedra Blanca in the Dominican Republic I saw a huge strangler which had completely enveloped the trunk of the palm with its crushing anastomosing aerial roots, until the smooth towering shaft of the stately palm appeared to emerge from its top. The palm, by the constriction of its bole, had actually been able to elongate its trunk even more rapidly than normal, and its great fronds overtopped the leafage of the victimizing *Clusia*. A photograph of this palm is shown in Fig. 4.

One may now look at the actual facts in the life history of these stranglers and philosophize a little. In the true technical or botanical sense they are not actual parasites like the true parasitic dodder *(Cuscuta)* or mistletoe, for they establish no intimate organic grafts or connections for the abstraction of nutrients from the host. These stranglers, however, develop a more intimate physical relation with the host than other trees which in their competition merely rob their neighbors of the necessary sunlight for their existence. These stranglers kill by actual contact as well, due to their peculiar habits of aerial stem formation. The natives say a strangler must begin life high up on another tree to become a tree itself, and that it cannot begin its life as a seedling on the ground like a normal tree. If this is true, then it is a tree whose trunk must grow downward in the final analysis rather than upward as in the case of normal trees. Whether this is an invariable rule I do not know, but all that I have seen appear to have had an epiphytic start in life. These stranglers may kill or destroy, but in an anthropomorphic sense they do not choose, kill, murder, destroy or deliberate in their behaviors. They are merely trees that perhaps must begin life as simple epiphytes, and as they develop with a highly specialized and irrepressible energy of growth, they destroy their supporting host by physical force and shading. These killers would even destroy their own kind by the same methods perchance, although it is conceivable here that actual grafts of limbs and

Fig. 6. *Clusia rosea* has finally choked its victim to death and is now on its own rooted branches, henceforth to be an independent tree attached to the soil. Near Petionville, Haiti.

roots might occur with definite benefit to the original tree. Whatever one may think about the strangling fig or *Clusia*, it is without question a most remarkable and successful specialization in the vegetable world.

CULTIVAR (from page 7)

Lombardy poplar, for example, was started from a vegetative sport back in the early eighteenth century, and has been maintained by vegetative reproduction ever since. This is, however, an example of maintenance through vegetative means, and does not have the problem of so-called sexual reproduction to bother its continuation.

The naming of cultivars has had much consideration given it. Most frequently the cultivar has what the international rules consider to be "fancy" names. These are usually eye-catching terms and are given to help with the sale of the plant. The names frequently give us some insight into a particular period in our history. For example, the dahlia which was given the cultivar name 'General Eisenhower' most certainly was given to the plant when the general was leading the victorious allied armies in or shortly after World War II, because no grower today is so politically short-sighted as to shut off all possible buyers who might be Democrats and not Republicans.

Once an epithet (a term which botanists dearly love to use) has been applied to a particular cultivar, this term should never again be applied in any other connection. If a cultivar name is applied to a rose in France, it must be used without translation in England (if you wish to know what the name means, you may translate it in brackets after the French, but the translation alone will not suffice). In order to be assured that the name will not be reused, the name must be published in a reputable publication. Reputable publication is a stretchable term, however, and one may find new cultivar names in a large variety of magazines, newspapers, and so forth, although the practice is dying out for the latter. Furthermore, the name should be accompanied by a short description of the plant involved. So far, the cultivar description may be written in the language of the author, which is a far cry from the strict rule for botanical species and varieties that requires that the description be written in Latin or it will not be recognized by botanists of the world.

If these rules seem restrictive, ponder a moment upon the situation which would arise if such regulations were not in force. Who would know whether his name would be of any use to him if there were no assurance that the same name were not applied to an entirely different plant, even if of the same species? What would be his chance for successful sale of his plant patent, if there were no regulation which prevented any not-so-reputable individual from applying the name to any other cultivar, just so he might capitalize upon a popular name? Providing names for some of the roses is becoming most difficult because of the rules, and frequently much money in prizes will be given for the best name for a particularly desirable new variation.

Doubtless with the publication of this erudite article, all confusion will now be dispelled. Furthermore, all will certainly use the word cultivar in its proper connection, leaving to the botanist his term varietas. If this actually be the case, then there must have been a rare and beautiful new cultivar developed in the human species.

MINIATURE ROSES (from page 4)

Plant lice are fat green aphids which materialize out of thin air, feed on the fresh green tips of defenseless plants, and multiply incredibly fast. "Malathion" or "Lindane" will settle them, too.

Powdery mildew appears as gray, woolly spots on the leaves, which curl up and wilt. This will spread very quickly over the whole plant, so catch it at once. Remove affected leaves, spray or dust with a fungicide — captan, "Orthocide," "Mildex," manebor, "Fermate" are all good."

Black spot is a fungus which appears as large brown or purple areas on the leaves. Pick off, gather up fallen leaves and burn them all. Spray or dust as for mildew.

But do not let me discourage you with all this sinister talk of disease. There is much more healthy growth than illness. In fact, you may be busier with pruners, keeping the plants in bounds, than with duster or sprayer. Most baby roses are true plant extroverts; they love to grow and bloom.

Now I shall mention briefly the miniatures I have found best for growing indoors—for small size, bushiness, general health, and constant production of flowers. Some which are as good must be left out, as they are not readily available. Some that I love dearly are too tall growing, others too miserly with their blooms, or ungainly in habit. The best whites are tiny 'Pixie,' 'Frosty,' large but lovely, and a constant bloomer, and cream-white 'Twinkles.' Two attractive yellows are 'Baby Gold Star' and bright buttercup-hued 'Bit o'Sunshine.' Then comes yellow, orange and red 'Presumida.' Good pinks are pale flesh 'Cinderella' and light appleblossom-pink 'Sweet Fairy,' still the most fragrant, daintiest, best all-round rose of them all; 'Cutie' is bright pink and very small; 'Rouletti' and 'Tinker Bell' are deep pink; 'Patty Lou' is a bicolor, pink inside, silvery rose outside; 'Robin' is a lovely carmine with quilled petals. 'Perla de Alcanada' is light crimson and a heavy bloomer; 'Red Imp' and 'Dwarfking' are fine dark crimson.

Most nurseries carry one or two miniature roses. Those which specialize in them are Conard-Pyle Co., West Grove, Pennsylvania; Jackson & Perkins, Newark, New York; Lamb Nurseries, E. 101 Sharp Ave., Spokane, Washington; Sequoia Nursery, Visalia, California; Spring Hill Nurseries, Tipp City, Ohio; Wayside Gardens, Mentor, Ohio.

HANG IT (from page 2)

of orchids on bark or tree branches, there are the fern-balls and sticks of *Davallia bullata* rhizomes, and the staghorn fern which is happy in a pocket of bark or on a back board of tree-fern lumber. This material in various forms makes a natural medium for growth of this epiphyte and of most bromeliads, and may be obtained as containers, or cut and joined to form pockets.

Other subjects for sophisticated "hangers" are *Schizocentron elegans,* the colorful Spanish shawl; *Wedelia trilobata,* a galloping tropical composite; various *Pilea* species; and *Streptosolen Jamesonii.*

So, the next time you are fascinated by one of these hanging gardens, resolve to make one yourself. With correct house conditions for the plant selected, the chances favor success, if you make a sponge of large water-holding capacity and keep it moist.

Gardening in America

By Charles A. Robinson

This is the second part of Mr. Robinson's contribution to The Garden Journal; the first, "Gardening in England at the Turn of the Century," was published in the November-December 1958 number. Here, Mr. Robinson relates some of his experiences in gardening during his first half of the twentieth century.

WITH MY WIFE AND TWO CHILDREN I left England on April 17, 1911, aboard the new Cunard Liner, "Franconia," on its maiden voyage. We landed in Boston on the morning of the 27th and at once entrained for Piermont, New Hampshire, and the home of old-time friends. We were now in the New England that we had heard so much about. I did not expect to settle there, for it was entirely rural with no large estates and I had hoped to get something similar to what I had been accustomed to in England. However, an extensive club house was being built at Tarleton some eight miles from Piermont, and I was unexpectedly offered a position there. On the day in May when I first saw Tarleton, snow fell from early morning until mid-day, and it looked like midwinter and the North Pole.

Tarleton itself is a plateau of over a hundred acres, with Lake Tarleton on the western and Lake Constance on the eastern side of the plateau, the whole surrounded by forests as far as eye can see. Lake Tarleton Club occupied five thousand acres; there were three other lakes within that area besides the two mentioned.

I spent that summer with my family in a cottage on the shore of Lake Tarleton. We were enchanted with the beauty of the country, with its mountains, lakes, and forests. It was a veritable Paradise, but for me it was to be a nightmare in Paradise. It was hoped that the club house could be opened in July, but the building itself was far from completion; and except that the putting greens had been seeded the previous fall, nothing had been done on either golf course or grounds.

The land had been farmed but was run down. The topsoil was shallow and overlaid hardpan. Rock and huge boulders were everywhere. I shall say little about that first year, for while the work was interesting, much of it was discouraging and far from amusing. I shall, however, tell you about our first flower beds.

Mr. Pike, owner and president of the club, wished me to concentrate especially on laying out beds and having a display of flowers by July. He did not wish to buy plants for this purpose but wanted me to get the desired results from seeds. What I planted was left to my discretion. I laid out a bed sixty feet in diameter, midway between the porte-cochere and the highway, a distance of four hundred feet. A walk surrounded the bed and extended to the porte-cochere on the one side and the highway on the other. On the outside of the walk a border ran the entire length on both sides, four feet in width. I sowed the bed and borders with seeds of Shirley poppies, both single and double, and edged them with nasturtiums. I used 'Empress of India,' a dark foliaged and red-flowered variety, and a primrose-flowered variety and thinned the seedlings to six inches apart. The beds were such a success that poppies remained a feature for years. Later I subdivided the big bed into five beds, a circle in the center and four half-circles, divided by grass paths. I also laid out a cutting garden with beds and borders and enclosed by a bronze-foliaged barberry hedge. The center beds were planted to perennials and the others to annuals. Plants were purchased to furnish this garden the first year.

In spite of many obstacles we did succeed in having a golf course, tennis courts, and an abundance of flowers that first summer. In November, when everything was frozen and a foot of snow already on the ground, I moved down to Pike. I had rooms in the home of the president, supposedly for the winter but remained there for five years. The grounds were nice and there was a fairly large greenhouse; I grew some of the best calceolarias I have ever grown in that greenhouse, and also carnations.

I took charge while an English gardener, who had been there some years, went to England for a vacation. When he returned in the spring of 1912, he became greenskeeper while I supervised both places. He did a fine job on the golf course and was still at Tarleton when I left in 1936; in fact, he took my job.

I had a notion to grow some currants, of which I am fond, and planted several dozen bushes of red, white, and black varieties. I was unaware then that the white pine blister rust, the worst disease of the white pine in the New England states, spent part of its life cycle on the currant, both wild and cultivated. Just about the time the

plants were ready to bear fruit, the state inspector came along and without so much as "By your leave," uprooted them all.

I made quite a planting of roses at Tarleton. The greater number succumbed the first winter; after the second winter only a few plants remained alive. Those few were the old 'Frau Karl Druschki,' a very good white rose at that time.

After the first year we raised all our plants but our only facilities were coldframes and hotbeds. A greenhouse was never contemplated, but we got along. It was quite a trick, though, to get plants from seeds sown in April ready for planting out in June.

We eventually built up a tolerably good golf course, but from the outset there never seemed to be sufficient funds for the maintenance, equipment, fertilizers, fungicides, and other things so necessary for the upkeep of a first-rate golf course. This was just over forty years ago, and remarkable strides have been made in methods pertaining to the care of grass and golf courses since then. Our first gang mowers were drawn by horses wearing boots. Later the chassis of a Model T Ford was used to haul the mowers. It was not until the early 30's that Jacobson introduced the first power-driven putting green mowers. Our putting greens had to be weeded by hand and what a job that was! That is where I made my first acquaintance with crabgrass. I have wondered sometimes whether the Good Lord had crabgrass in mind, together with the thorns and thistles, when he drove Adam out of the garden to fight weeds evermore.

We produced a quantity of fresh vegetables from the large vegetable garden. This, too, is where I saw the potato bug, the Colorado beetle, for the first time; I had never seen it in England. Skunks were plentiful in New Hampshire, and they were a pest on the greens where they would dig holes the size of a coffee cup in their search for grubs of the June bug. I used to go out after dark and shoot skunks. I held a flashlight in the same hand that held the gun barrel, and the skunk made a good target.

Gladiolus was a favorite cut flower at Tarleton, doing well in that climate and being seldom bothered by thrip. Delphiniums and phlox were the backbone of our perennial borders, and we were not troubled by disease in our delphiniums nor by mite. As in England, the plants stood for years and could be divided again and again. (In Ohio, later, I was tempted to treat the Pacific hybrids as biennials, owing to the prevalence of black rot.) We grew the old *Chrysanthemum uliginosum*, heleniums, and asters, and any other perennial that we found would withstand the severe winters and at the same time flower early enough to be of use.

Early in the war years, owing to the fuel situation, we had to close down the greenhouse at Pike. My greatest regret was the loss of a night-blooming cereus which covered the entire end of the greenhouse.

After the war I returned to Tarleton and acted as caretaker of the Club and supervised the logging and ice-cutting operations during the winter. A bobbin mill was located near the power house, and the waste from the mill provided fuel for the fires that generated power and light for the Club. We used to cut upwards of ten hundred thousand feet of logs every winter. It used to take a crew of six to eight men a month to cut ice for the Club and for four children's camps which operated on the Club's land.

The Club, as such, had never been a particularly paying proposition, and after 1930 it became increasingly apparent that it would sooner or later have to be sold. In fall 1935 I received a

call from the bank that held the mortgage on the Club, to the effect that a family who had twice before inspected the place with the object of buying, again wanted to go over it. The people told me they were definitely going to buy the property, but it might take time to come to terms, and hoped I would be there when they took over. They did eventually purchase Tarleton Club with the entire five thousand acres, but they did not find me there. In April 1936 I received a letter from Joseph Robinson, a resident of Toledo, Ohio, and a member of Lake Tarleton Club, stating that he was building a summer home a few miles out of Toledo and would I come and act as caretaker and gardener. He was the best-liked member of the Club, I knew him well and I had no hesitancy in accepting his offer. I regretted leaving Tarleton for I loved the place, although it had occasioned me untold headaches. I had been "all kinds of fool" for remaining so long, many of my friends told me in no uncertain terms, but they had been for the most part happy years.

My wife and I arrived in Toledo on June 3, 1936, and I took up my duties the next day. The estate comprised some ninety acres, about ten in woods, ten in the lowlands along Ten Mile Creek, which used to flood every time water was high, and the remainder under grass or sown to soy beans. The site chosen for house and gardens was the worst soil of all, a clear yellow sand. The exterior work on the residence was well advanced, the driveway

outlined and excavated, and our friend, Charles Crawford, had a crew working on that project when I first met him.

It was, of course, useless to attempt to do anything around the house until after the builders had finished and so I concentrated on the vegetable garden. Berger and Linnard were the original landscape architects and plans were available. The vegetable garden was two hundred feet square, about three thousand feet short of an acre. The land was infested with quack grass and goats' beard which folks nearby told me I would never get rid of. They were mistaken, for when I left Toledo there was not a sprig in the garden. Apple trees of fruiting size planted around the vegetable garden in the years to come produced bounteous crops. I manured, plowed, and planted the garden and, although late in starting, had good crops even of canteloupe which I had never before grown outside. Most of the canteloupes were confiscated by the men working on the buildings.

I grew vegetables of all kinds, including celery and chicory. Banked with earth and covered with hay, celery would keep until the end of March. The chicory or Witloof I used to force; it is the well-known French endive.

The formal flower beds next received attention. As the soil was all sand, I excavated and replaced the sand with manure and topsoil. The beds were planted to perennials that fall, and much of the lawn area was seeded.

The cutting border extended through the center of the vegetable garden from the stable yard to the main lawn, on either side of a twenty-foot strip of grass. The borders twelve feet wide were in later years, when in full flower, a beautiful sight.

Mr. Robinson was determined that there should be plenty of water, so five wells were drilled. Unfortunately, there was sulphur in all of the wells. However, I never noticed that it injured any vegetation with the exception of *Viburnum Carlesii*. It would badly spot the foliage of that shrub and sometimes turn it quite black.

We moved into the residence that summer and the first night we experienced a severe thunderstorm and the power went off. Going in search of a flashlight and not being acquainted with the layout of the house, I stepped into what I thought was the kitchen. Instead I stepped into the cellar—and space. I landed at the bottom of the stairway in a heap. Theoretically I should have broken my neck or bashed my brains, but except for a bad shaking up I was unhurt.

I grew many roses during those first years in beds on the lawn beyond the swimming pool. I set out a hundred plants of the climbing rose 'Blaze,' when it was first introduced, along the fence by the side of the driveway from Sylvania Avenue to the cottage, and it was truly a blaze when fully established and at the peak of bloom. A climbing 'New Dawn' rose, trained over the cottage porch, met the eye after passing the red roses and made a pleasing contrast. 'Blaze' was beautiful when introduced, but today is far better than it ever was.

I planted a small orchard of pears, peaches, plums, apricots, cherries, and quinces near the residence; all produced abundantly good-quality fruit but were eventually uprooted and replaced by evergreens.

A small lake was excavated in the lowlands, and through a ravine which led to the lake a series of waterfalls was built. A well was drilled at the head of the ravine to furnish additional water, supplementing what was already there. This was to have been a trout brook, and both brook and lake were to have been stocked with rainbow and brown trout; but because of the sulphur in the water, no fish were ever introduced.

In that ravine, as in others on the property, wild flowers grew in profusion. I enumerated nearly a hundred kinds for Mrs. Robinson—I even found a few plants of the fringed gentian, which is now rarely ever seen in its wild state, and a few plants of wood betony which is not seen much any more. Spring-beauty, hepaticas and trilliums were everywhere.

After the planting as originally planned had been completed, Mr. Robinson had Charles Crawford bring in more trees. [Mr. Crawford, landscape contractor and nurseryman, is active in the Men's Garden Club of Toledo.] We planted oaks, maples, elms and a weeping willow near the cottage, sugar maples along the driveway, and some thirty clumps of birch in various locations around the grounds, the biggest group near the cottage. These birches Charlie had collected in Michigan — and I never saw planting material delivered on the spot in better shape. The clumps, all on platforms, were frozen solid when delivered in April. We

The author, at the right, is judging at a flower show of the Men's Garden Club of Toledo, Ohio.

were never bothered with borer in this consignment; but in some trees that had been planted earlier, the borer was so bad that the clumps had to be cut to the ground. They grew new wood and formed fine clumps later. The birches attracted wide attention through the years. Charlie also collected all the dogwoods scattered through the grounds.

Coming to Ohio gave me my first real opportunity to grow hardy chrysanthemums. Apart from a few August-flowering varieties we had, at that time in England, none other than greenhouse varieties. In New Hampshire where frost comes so early, no varieties adapted to the climate were then available. Now, however, at Durham University in New Hampshire they are crossing the native chrysanthemum of Korea, *sibericum*, with the hardiest varieties obtainable and are getting some fairly hardy varieties. Sixteen will be obtainable from local nurserymen this spring. I have derived more pleasure from growing hardy chrysanthemums than from any other single subject.

Several of the old-time members of the Men's Garden Club of Toledo, Ohio, knew Mr. Robinson well, and what a kindly, likable fellow he was. He was somewhat a sentimentalist, too, as is proved by the following. In the late 30's a motion picture was being shown called "Apple Blossom Time." In it Jeanette Macdonald and Nelson Eddy sang "Sweetheart, Sweetheart" from a rustic seat under an old apple tree with the appleblossoms showering down upon them. Mr. Robinson saw that picture, and he wanted Charlie Crawford and me to duplicate that setting; he wanted us to get the biggest apple tree obtainable that could be moved. As it happened, Charlie had an uncle in Blissfield who was then considering the rooting up of an entire orchard in its prime, because of the low prices of apples. We had the pick of that orchard, but what an experience in getting home with that tree! An apple tree does not lend itself to trussing up as does an elm or a maple; the branches will break before they will bend. The tree took up almost all the road and blocked traffic. However, we got it home, planted it on the lawn on the west side of the residence, and placed a rustic seat around it. There were two varieties of apples on the tree, 'Northern Spy' and 'Black Detroit,' and until I left Toledo it was bearing good crops of both. At blossoming time, it needed only Jeanette and Nelson with their beautiful voices to complete the picture. Joseph Robinson never saw his dream at its best, for he was compelled, owing to adverse circumstances and ill health, to sell "Celemar," as he had so fondly named the place. Royce G. Martin, the purchaser, owned the place three years but never lived there a day.

Between the time Mr. Robinson sold the place and Mr. Martin engaged me, I worked with Mack Newkirk at Walbridge Park Greenhouse. It was a pleasant interlude and agreeable change, for since leaving England I had a greenhouse only at Pike, New Hampshire, and I sorely missed having one. Mr. Newkirk, a skillful grower, especially with chrysanthemums, had a fine show at the greenhouse yearly.

I saw but little of the Martins during their occupancy. They appeared occasionally but seldom together. Mr. Martin would come up in the afternoon, relax around the swimming pool, and sit with us at our evening meal. Mrs. Martin would come up with architects and builders and go over the changes she wished to make. Their pilot would fly vegetables, fruit and flowers to their Kentucky home every few days.

Mr. Martin sold the property to Mr. and Mrs. William W. Knight, Jr. As far as the gardens were concerned, things went along much as in the Robinsons' time, but there were changes. We did more planting in the bottom lands, adding English hawthorns and many varieties of crabs. We also planted many evergreens, among them Ponderosa pine, Douglas-fir and the incense cedar. Mr. Knight has since his acquisition of "Tantara," as he named the place, added another item of considerable interest. A decade ago when the multiflora rose was being so widely advertised, he was intrigued not only by its possibilities as a hedge but as a fence. We planted a hedge completely around a uniquely shaped eleven-acre field, spacing the plants eighteen inches apart. In 1953 the hedge was six feet high and as far through. There was no doubt as to its value as a fence. It was a beautiful sight when in full flower and also in winter when covered with its scarlet berries or fruit. It provided protection for pheasant and quail, and they enjoyed feeding on the berries.

In June 1953, owing to the serious illness of my wife, I brought her back to New Hampshire. My wife died the following spring. Since then I have spent winters in New York with one daughter and summers in Piermont, New Hampshire, with the other daughter. My son-in-law is a dairy farmer, and now for the first time since leaving England I am getting all the organic fertilizer I need. We have a large vegetable garden and a quarter-acre lawn. We grow all the vegetables we need for immediate use and for canning and freezing. I grow some subjects which I know to be a gamble, such as canteloupes, watermelons, peppers, and lima beans. Sometimes they mature, often they do not. We grow good tomatoes; but frost comes too early and last year we lost half the crop. We grow a lot of sweet corn and last year picked corn every day from the last day of July until the first week in October.

I have never grown annuals to such perfection as I grew zinnias, asters, snaps, celosias, and marigolds last summer. Although it was the driest summer ever known in New Hampshire, I never watered the flowers. We had, however, unusually cool nights which seemed to suit them. I grow many pansies, and have one plot of very acid soil in which they do especially well. I may try some of the chrysanthemums brought out by Durham University this summer; it will be a pleasure to have a few that will survive the early frosts.

I was asked to relate my experiences in gardening in England and in America; upon perusing these pages, it looks as though I had written my life history. That was not my intention, but I shall make no apology. Regard it, if you will, as a human interest story of one of the first, and perhaps the oldest, members of the Men's Garden Club of Toledo. Gardening has been my life, my livelihood, and my hobby. There has never been a time from earliest boyhood when I have not been connected with a garden in one way or another. Whatever my lot in the "Great Beyond," I shall not be happy unless I am provided a small garden in a corner somewhere.

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A Country Housewife's Garden

By **Gertrude B. Foster**

WHILE THE American Indians were this country's first herbalists, using almost every native plant for food, flavoring or medicine, the colonists brought with them seeds of herbs. Some of these have spread so thoroughly throughout the northeast that we consider them weeds. Recently Anya Seton, author of THE WINTHROP WOMAN, has given us a picture of life in the early days when every woman was doctor as well as herb gardener to herself and her family.

Lest we think the fast-paced novel was overdrawn, it is interesting to read contemporary comments such as that of William Wood in his New England Prospect, 1634, quoted in U. P. Hedrick's excellent HISTORY OF HORTICULTURE to 1860: "there is likewise growing all manner of Hearbes for meate and medicine and that not only planted in gardens but in the woods, without either the arte or helpe of man, as Sweet Marjoram, Purselane, Sorrell, Peneriall (Pennyroyal), Yarrow, Myrtle Bayes etc."

Mr. Hedrick concludes from John Josselyn's accounts of "New England Rarities Discovered" 1672 and "An Account of Two Voyages to New England," 1674, that the herb garden was larger and better cared for than the vegetable garden. Helen Noyes Webster was well aware of our heritage of herbs and included in her book, HERBS, HOW TO GROW THEM AND HOW TO USE THEM, a chapter on "Colonial Gardens." In it she lists John Josselyn's record of pot-herbs and simples growing in New England fifty years before the Pilgrims arrived at Plymouth. Also there is the table of herbs mentioned before 1700 in Colonial records, taken from GARDENS OF COLONY AND STATE compiled by the Garden Club of America and published in a handsome volume by Charles Scribner in 1931. Fortunately, Mrs. Webster's book is still in print so that readers who live far from large libraries may discover for themselves the basis for many herb gardens now planted near historic homes.

We became intrigued with the subject through weeding and replanting the unique Girl Scouts' Herb Garden at Storrowton, a reconstructed early American village on the grounds of the Eastern States Exposition grounds at West Springfield, Massachusetts. It was in Mrs. Webster's book, the first one we ever owned on the subject of herb gardens, that we saw a plan for the garden which was designed as a gift to Mrs. Helen Storrow. The New England Girl Scouts' Council called it "Aunt Helen's Herb Garden" and presented it in 1935 to the lady who had given the old buildings at Storrowton. A stone by the sundial is engraved with the date and the message of New England Girl Scouts' Council.

When my Girl Scout daughter and I finally got a chance to visit this garden in August 1958, it was waist-high in weeds. We had known that Mrs. Hendrick Fickweiler had had to give up her twelve years of care of it two years ago, but we were not prepared for the sad condition in which we found the garden in its charming stone-walled setting. It had not been weeded for these two years. The herbs that remained from the more than one hundred advertised in the Exposition's pamphlet on Storrowton scarcely could be seen through the curtain of wild lettuce stalks and ground mist of wild sorrel blossoms. Inquiry at the main office revealed that there was no one around who knew enough about herbs to weed the garden. In fact, it was planned to have a nursery replant the space with something else in time for the Eastern States Exposition, the end of September.

Of course, having been once a Girl Scout, always a Girl Scout, so my daughter and I made another visit to the garden a few weeks later and spent five hours pulling weeds and replacing them with plants from our own garden. Despite the fact that the New England Girl Scouts' Council had abandoned the garden because no one was interested in herbs, it remains the only Girl Scouts' herb garden in the country with a sign saying, "Replanted 1958 by Lone Troop One, Falls Village, Connecticut." Next spring we hope to get permission to replace the annuals with perennials which will eliminate much of the need for weeding. Those that were alive after long neglect included santolinas, lavenders, thymes, southernwood, rue, tansy, yarrow, bugle weed, and winter savory. The thyme seat in the stone wall at the corner of the garden was still softly furnished with scented padding and had suffered no invasion from weeds.

From our neighbor Lewis Gannett, who makes his private farmhouse library of more than five thousand books available to friends, I borrowed a number of books on the subject of gardening in the colonies. One of the most interesting purports to be the first American book on kitchen gardening by John Randolph, Jr., "a Citizen of Virginia." Called A TREATISE ON GARDENING, the reprint edited by Marjorie Fleming Warner for the William Parks Club of Richmond, Virginia, is dated 1924. Miss Warner places the original as having been published some time between 1752 and 1775 by interesting detective work. She found that the book relied on Philip Miller's GARDENER'S DICTIONARY, which was published in many editions in England starting in 1731, but quoted a particular edition which was different from all others and therefore enabled her to date the Treatise. Thomas Jefferson owned copies of the Randolph book and the famous Miller volume, a first edition of which is at hand in the Gerard Society Library.

When a snowstorm on the third of November found us with the plow off the "Jeep" and only our fourteen-year-old son's strength to shovel out the long driveway, I really didn't mind the shut-in feeling. I had already turned from the garden outside which was not at all frozen, chrysanthemums being in bloom but bowed to the ground with heavy wet snow, to herbs in Thomas Jefferson's vegetable beds as described in his GARDEN BOOK. Excerpts from Jefferson's garden log running from 1766 to 1824, annotated by Edwin M. Betts for the American Philosophical Society, were published with extracts from his other writings under the title of THOMAS JEFFERSON'S GARDEN BOOK. It makes more fascinating winter

reading than seed catalogs for Jefferson had dreams, too, and chafed at being away from his garden all the time he was in office in Washington, D.C.

In 1794 Jefferson set down the following as "Objects for the garden this year:" sage, balm, mint, thyme, lavender, marjoram, camomile, tansey, rue, wormwood, southernwood, rosemary, hyssop, perywinkle, marshmellow and beargrass *(Yucca filamentosa)*. In addition he listed among the vegetables: French sorrel, shalots, leeks, garlick, parsley, hops and horseradish. It is a joy to see how irregular his spelling.

Burnet was sown as a pasture crop, while scarlet pimpernel was grown in Jefferson's garden for salad. Bene, or sesame, which he called many different names, was planted on a large scale, Jefferson notes that it takes "1 gill of seed to drill 12 rows 153 yards or 2 gills to the acre." The details of planting were carefully charted in his yearly "Kalendar." "Tomatoes in high border VI" may be one of the earliest records, 1811, of growing tomatoes for eating in this country.

Thomas Jefferson's struggle to get tarragon started at Monticello strikes a familiar note. In 1806 he wrote to Bernard McMahon, seedsman of Philadelphia, ..."Th.J. has been many years endeavoring to get some seed of Tarragon, but without success. If Mr. McMahon has any, a little of it will be acceptable."

Bernard McMahon replied April 30, 1806, "It gives me much pleasure to have it in my power to send you a few roots of the *Artemisia dracunculus,* or Tarragon, these I forwarded by yesterday's mail and hope you will receive them in good condition; they propagate very freely and abundantly by the roots, and are perfectly hardy, requiring no additional care or protection in winter. Should those forwarded miscarry, I will send you a small box of them in a growing state."

Like many correspondents on garden matters, Jefferson either forgot to mention or refrained from doing so, the fact that tarragon did not succeed, if it arrived at all. Mr. McMahon inquired again in July as to how the tarragon succeeded. Perhaps Jefferson's answer was not among his papers, but it was not until 1809 that tarragon was recorded among the seeds sown and plants set out in April in Border VII. In January of that year Mr. McMahon promised to send him another supply of tarragon plants, if those sent previously had not produced. We find no answer to this query either, just the notation about the planting of tarragon in the "Kalendar." But the new roots must have had a hard trip from Philadelphia to Virginia, because we find one word describing the tarragon set out April 12, 1809, "failed." Evidently both gentlemen gave up because there is no further reference to tarragon in their correspondence published in the Garden Book.

RAISING CLEMATIS (from page 15)

On November 9, 1954, I sank several pots of seedlings along a line in a rose bed and covered them a little with soil to protect the pots and contents from being damaged by freezing weather. The seedlings were removed from the pots on February 5, 1955, and planted in the same hole without disturbing the roots more than could be helped. The roots intertwined and almost filled the pot, and it seems almost impossible to separate the individual plants. These seedlings grew well during the summer and had a variety of large and interesting blooms. I put numbers on twenty-three of them, hoping to keep track of them so that I could layer the vines later. My plan was to train each vine on a separate string so that it could be identified for layering. The early and severe winter weather killed all of the growth above the ground, and most of the labels were lost, but one plant survived and bloomed very early. All of those groups that had been frozen started in growth early and have made very vigorous growth. There have been a number of very fine blooms, and others are developing. Some "have wide, ample blooms, beautiful petal placement and fine color." The survival of so many plants after that unusually severe winter weather speaks well for the hardiness of the clematis in this region.

I presume that none of the parents of the present large-flowered hybrids have been pure-bred so that they could produce identical varieties if self-pollinated or used in hybridization. Some characters may be good and some bad, but nevertheless hereditary. Unless protected from cross-pollination by wind, bees and other insects, it is not possible to conclude that any given seedling has come from the genes of the seed parent alone. I have watched honey bees busily going from one clematis variety to another, thus making it possible for natural cross-fertilization to take place if conditions are right. Each plant from seed results from the union of pollen and ovum, each of which is a store-house of hereditary characteristics brought down through the ages.

Usually a number of volunteer seedlings appear in various places in my garden in early fall. I have allowed most of them to remain undisturbed, but have lost most due to the many things which can happen during winter. This year, when the volunteer seedlings began to appear in early September, I decided to pot as many as I could. Now I have over fifty growing in my little greenhouse. Some of these potted seedlings are eight to ten inches tall.

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DISH GARDENS TERRARIUMS *and* NOVELTY PLANTERS

By Walter Singer

THE PLEASURES and thrills of arranging plants in decorative containers have been enjoyed for many years. The Japanese, masters of training plants and trees as miniatures, have practised the art of flower and plant arrangements for centuries. For a long time, fern dishes were fashionable in the home. Later, plant arrangements for special-season gifts were popular, such as Thanksgiving or Christmas baskets. Then, the rage for dish gardens and terrariums started during the twenties and thirties of this century. Since this trend is comparatively new, the many possibilities of plant arrangements or plant companionship have not been fully explored. The kinks still have to be straightened out, as they say in the industry. This goes not only for the amateur but for the professional, who could be more discreet in selecting plants and containers.

The plants grouped in an arrangement must go together in more ways than one. They should be plants which grow under the same light and atmospheric conditions. They should be plants with more or less the same vim and vigor in growing so that they do not choke each other after being in one another's company a short time. All these factors should be considered before plants are arranged in dish gardens, terrariums or any other type of planters where more than one or two plants are used together. Such plantings can be planned in much the same way as landscaping is mapped before the ground has been touched. Each type of planter, to begin with, requires a suitable soil mixture. A terrarium soil mixture should be rich in humus and organic ingredients. A cactus dish must have a soil mixture with good drainage components. Here are three soil mixtures:

Terrarium soil mixture
- 2 parts of leafmold
- 1 part of soil
- ½ part of sand
- ½ part of orchid fir bark or peat moss

Cacti and succulent soil mixture
- 2 parts of soil
- 1 part of sand
- ½ part of lime rubble
- ½ part of leafmold

Soil mixture for general planters
- 2 parts of soil
- 1 part of leafmold
- ½ part of sand

CONTAINERS

The choice of containers for dish gardens will, to a great extent, depend on individual taste. Some people may prefer oriental pottery of Japanese or Chinese designs; others like the modern California pottery. Each has its own charm and appealing qualities. A container plain in design and of a subdued color will always be attractive and act as a frame to bring out the beauty of the plants. There are some points, nevertheless, which should be observed in selecting containers. For most types of dish gardens, the container should be at least two and a half to three inches deep. Only cactus, succulent and bromeliad arrangements could be made in containers slightly shallower than two inches. In general a three-inch depth is the most practical, because plants for dish garden purposes are usually grown in two or two and a quarter-inch pots. A container two and a half to three inches deep also has the advantage of having enough depth for anchoring plants securely. It is difficult to plant an arrangement in a dish which is too shallow; plants will not stand up firmly.

Only a very small percentage of containers have drainage holes—the reason may be that the containers are also used for flower arrangements which should be able to hold water. A container to be planted as a dish garden, however, should be able to let the surplus water drain out. So, if the container you have selected is not provided with drainage holes, have a reliable craftsman drill some holes in the bottom; this will pay off in the long run, as those holes will help to overcome excess moisture to a great extent. The holes should have the same diameter as those found on the bottom of a flower pot, about one quarter or three-eighths of an inch. In planting these holes are covered with broken pot chips as is done in potting plants.

Most planters are made in the same way as regular earthen ware is manufactured, with a high glaze, but here and there some attractive planters may be found which are of plastic, metal or wood. For certain plant arrangements (bromeliads) driftwood is to be recommended. In that case, individual holes are drilled for each plant or holes are carved so that they are large enough to hold groups of plants. Since there is not much room (depth) for holding soil or any other plant medium, only epiphytic plants such as bromeliads or staghorn ferns should be grown in driftwood planters.

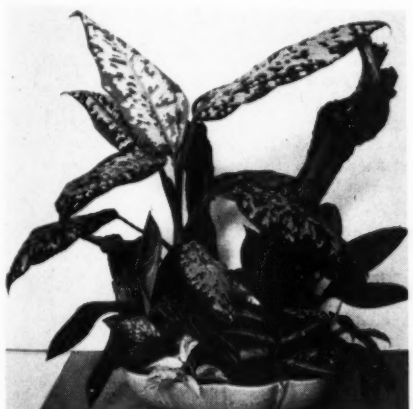
Another type of planter can be handmade for cacti and succulent arrangements. A piece of soft rock (tufa) can be chiseled out so that it is deep enough

to hold a group of slow-growing cacti and succulents. These plants usually have a small root system and are, therefore, very suitable for arrangements in either shallow containers or in pieces of hollowed-out soft rock. A similar effect can be obtained by cementing small pieces of rock together so that they form a natural-looking container. In

In a ceramic novelty planter, resembling driiftwood, a small palm, *Neanthe bella*, gives grace to the arrangement.

Mexican pottery some oblong dishes or round bowls are appropriate for cacti arrangements, as they are made of the same type of clay as the popular flower pot. Small strawberry planters can be planted effectively with a variety of succulents or with different types of vines, such as some of the fancy ivies. There are really many containers of varied shapes and sizes which can be used for dish-garden purposes. Sufficient depth and possible drainage should be guides in addition to personal taste.

For terrariums, the selection of containers is more limited. There are actually only two types: the rectangular box with separate walls and bottom and the one-piece glass container which can



This arrangement is "made up" with members of the aroid family which require the same atmospheric and watering conditions.

be a round bowl, an oval bowl, or a brandy snifter. Either type provides a planting area which is surrounded by glass. Light enters from all sides, but air circulation is stopped by the glass walls. This basically defines the function of a terrarium. Originally, a terrarium was the means of transporting plants in a container which would provide atmospheric protection for them during a long ocean voyage. Nathaniel B. Ward, an English botanist, invented such a terrarium box and in 1842 published a book describing the use of a Wardian case. Such terrariums or Wardian cases were useful to botanists in their early plant explorations when neither airplanes, jeeps nor polyethylene were known. Later on, terrariums were used as propagation cases, for they could be easily moved into places where propagation could not be performed otherwise.

In each case, a terrarium provides a close atmosphere of high humidity favorable to plants which in nature grow under similar tropical conditions. Ferns, mosses, and tropical foliage plants which prefer a highly humid atmosphere are suitable terrarium plants. On the other hand, cacti and succulents never do well in a terrarium. This seems superfluous to mention, but again and again cacti and succulents are found in terrariums grouped with foliage plants or as desert plantings. The disappointment is disheartening when these plants rot away. A terrarium collects condensation whether it is entirely closed or whether the top is wide open. While this condensation is profitable to some plants, it is damaging, even fatal to cacti and succulents, which love open and dry air.

Because of the enclosed air and the consequent condensation, the care of a terrarium, especially with respect to watering, is quite different from the care of a dish garden or potted plants. As a matter of fact, it will be found much easier. Watering may be restricted to once a week or even less.

The question often arises whether the top (opening) of a terrarium should be covered or not. In most cases, a cover is not advisable since a rather small room—the inside of the terrarium —will not have enough fresh air for the plants. The condensation will be so great that damage from damping off and decay will likely occur. Only on cold winter nights, when the "super" reduces the heat, it may help to keep the tropical belles of a terrarium cozy. But then be sure that during the day

Tropical foliage plants, combined with an attractive piece of driftwood, make up a handsome arrangement. Here the finishing touches are given by moss.

the cover is removed. When watering is necessary, use a rubber ball syringe (hand-sprinkler, such as the housewife uses for damping the laundry before ironing). A good method for applying water is to rinse the glass walls of the terrarium, thus taking off the pressure and distributing the water evenly. When a one-piece glass container is used, such as the round or oval bowl, it is easy to see whether the terrarium is dry and needs to be watered. In these containers the soil is visible through the glass on the reverse (back) side of the planting.

Give the plants in a cactus arrangement such as this the benefit of all the sun and light available in a south window.

In tank-type terrariums, however, the soil may not be visible. Such tanks, however have large enough openings on top to put the hand through to test the soil for dryness.

To be Continued

BOOK REVIEWS

DARWIN'S CENTURY. Loren Eiseley. 378 pages, illustrated, indexed. Doubleday & Co., Garden City, N. Y. 1958. $5

Charles Darwin has long been inextricably associated with the concept of organic evolution, especially with the idea that natural selection and "survival of the fittest" have been the means by which such evolution has been achieved. His ORIGIN OF SPECIES, first published in 1859, in which he presented a great mass of observations and the results of some twenty years meditation in the subject, had an impact on the intellectual world and eventually on the laity of the reading world, such as no other single book, perhaps, ever had, except the BIBLE, with which it has generally been held to be in conflict. The association of Darwin with evolution has, during the past century, become so intimate that in the mind of the public he is widely held to have been the originator of the idea, and even among biologists he and Alfred Russel Wallace who, contemporaneously and independently arrived at similar conclusions, have been regarded as the initial promulgators of natural selection as the mechanism of evolution. That they were not the instigators, that their basic ideas were anticipated by other thinkers of the early nineteenth century, that those other thinkers paved the way for acceptance of their conclusions, and that Darwin's great service to biological science lay in his synthesizing the half-baked, nibbling ideas of others, corroborated by his own extensive observations, into a world-shaking concept of life on earth, are the principal tenets of this book.

Supported by the authority of the church, those in the seventeenth and eighteenth centuries who gave any thought at all to the nature of living organisms, believed implicitly in the fixity and immutability of species, a philosophy which taught that every kind of organism living at that time had always lived, that every kind that lived in the beginning still lived, and that every kind living at the time would continue to beget its kind until the end of time. The antithesis of this is the concept of change, of everlasting change, however slow it may be, of the disappearance of certain kinds of organisms during the course of greatly protracted time and of their replacement by other kinds. This is the essence of the concept of organic evolution, the mechanism of which Darwin conceived to be natural selection and perpetuation of favorable variations in the struggle for existence. The world in which he presented his revolutionary ideas was, for the most part, unreceptive to them and continued to be so for another seventy-five years. But already in the eighteenth and nineteenth centuries there were cracks in the idea of organic fixity, and those cracks, to be found in the writings of dozens of intellectuals, paved the way for Darwin's part in the development of ideas.

It is a comparative study of all those ideas, and an enumeration of the men who advocated them, that Dr. Eiseley has given in this book. The book, excellently written, is not easy to read, not because it is laden with factual material, which it is not, but because it is a history of ideas and of interpretations, and because the reader is presumed to possess at least some knowledge of the history of scientific thought.

E. H. FULLING

WAI WAI. Nicholas Guppy. 375 pages, illustrated, indexed. E. P. Dutton & Co., New York. 1958. (Printed in Great Britain.) $5.95

Wai-Wai is the name of an Indian tribe in the interior of British Guiana, the locale for the expedition reported in this book.

The style of writing will please the non-scientific reader immensely, for it is lively, constantly vivid, and highly descriptive. The scientific reader will have cause to criticize what he may term the "purple-prose" style, but he may recall that this is often what makes a book marketable. Unfortunately, Guppy does succumb to the common ailment of so many explorers and fishermen reporting their adventures — that is, the facts are often a bit overpainted or realigned to make a better story. For example, one who has visited this back-country may wonder at ants which the author faced "standing on their hind legs and hissing like snakes." To one who has spent even a few minutes in an Indian hut, it will come as a surprise that such a dwelling could smell of anything resembling incense! It will perhaps also be amusing to the initiated to find that the foul mess known as "Indian beer" could be "refreshing" to anyone other than an Indian.

The only other observation that the reviewer feels compelled to make is that the author treats very badly Jonah Boyan, a highly respected member of the British Guiana Forestry Department. This aged Arawak Indian knows not only the native names but also the botanical names of more plants in British Guiana than any other person, and he is intimately acquainted geographically with most parts of the colony. It appears from the frequent, bitter criticism of Jonah by the author, that Jonah resented, perhaps justifiably, Guppy's uncompromising, inexperienced direction of the expedition without more than occasional consultation with his local assistants.

These are relatively minor objections to a book which the layman interested in Nature will find thoroughly enjoyable, and a very detailed index permits the scientific reader to locate rapidly those sections in which he may be interested.

RICHARD S. COWAN
Dept. of Botany
Smithsonian Institution

A MANUAL OF AQUATIC PLANTS. Norman C. Fassett. 405 pages, illustrated, indexed. New edition with revision appendix by Eugene C. Ogden. University of Wisconsin Press, Madison. 1957. $6.50

A new edition of a widely-used and highly-valued handbook of plants is usually welcomed by every naturalist. When you open the "new edition" of Fassett's MANUAL OF AQUATIC PLANTS, however, be prepared for a surprise! The initial 362 pages are identical to those in the first edition of the Manual (McGraw-Hill, 1940), complete with typographical errors. All corrections and rather extensive revisions are grouped inconveniently into a "Revision Appendix" located behind the original "Appendix" and "Glossary." There are no new illustrations.

Although this method of revision has doubtlessly enabled the publisher to market the book at a lower price than would have been charged for a more sincere revision, the user will expend much more in time and effort than he profits by this false economy. Each time he identifies a plant, the user will have to remember to refer to the "Revision Appendix" to determine if there is an entry for the page on which his species appears. Then, he must determine if his species' taxonomic status has been altered or if there was a mistake in the original printing. Of course, there may be no change or corrections, thus relegating this additional chore to absolutely wasted time.

One way to overcome the inconvenience of the book's format is to do for yourself what should have been done by the publisher—scribble up, cut up, and paste up so that the revisions and corrections appear in their proper context in the body of the book. It is rather frightening to contemplate the cumulative research time that will be wasted by the thousands of persons who will use this book, either by clipping and pasting or by repetitious searches for revised and corrected data.

One might assume, since this "new edition" consists principally of a reprint of a book already owned by thousands of naturalists that the publisher would have sufficient respect for our over-burdened pocketbooks to make the very valuable, though too brief "Revision Appendix" available as a separate. A letter of inquiry to the University of Wisconsin Press, however, revealed that no such separate or reprint is available.

For those who do not own a copy of the late Dr. Fassett's ever-useful treatise, the "new edition" is highly recommended as an invaluable reference tool. Those who have a copy of the first edition may wish to purchase the 362-page "reprint" in order to obtain the 22-page "Revision Appendix." Or they may wish to do as I have chosen to do—borrow a copy of the "new edition" and "revise-it-yourself."

JACK MCCORMICK
The American Museum
of Natural History

GARDEN POOLS, WATER-LILIES, AND GOLDFISH. G. L. Thomas, Jr. 222 pages, illustrated, indexed. D. Van Nostrand Co., Princeton, N. J. 1958. $5.95

This fills a very big gap in books on this subject. The first book in this country was written by the late William Tricker in 1897. It was followed by another one a very few years later, but since that time nothing has been done in this field.

Mr. Thomas's book is written in a most interesting and pleasant style, indeed the chapter entitled "A visit to Lilypons" is really a romance of the business.

Planning for the pool is skillfully written and authoritatively presented. One of the points that Mr. Thomas brings out is that in building a pool, it is much cheaper in the end to be very particular about doing it right. The three most essential requirements in water gardening are definitely brought to the reader's attention — sun, water and good soil.

The construction of a concrete pool is explained in a very lucid and complete manner. If the instructions are carefully followed, there need be no difficulty whatsoever.

The foreword by the editor as to "every available water-lily and aquatic plant is described" is not quite a fact. Mr. Thomas lists over one hundred and fifty varieties of hardy water-lilies, and I doubt if one hundred of those varieties could be gathered together even from the ends of the earth. I do think that the amateur could

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TREE FRUIT PRODUCTION

By JAMES S. SHOEMAKER, University of Florida and BENJAMIN J. E. TESKEY Ontario Agricultural College

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not help but be confused by the names of so many varieties, which are not even available. The same applies to the tropical waterlilies. Almost one hundred of the day-flowering varieties are listed, and I doubt if even in a botanical collection there are more than fifty varieties available. Under the night-blooming varieties, of which Mr. Thomas lists about fifty, I feel that a diligent search would not locate more than twenty varieties anywhere in America. Those varieties which he does list, however, are well and attractively described.

Mr. Thomas very clearly describes the planting of pools. He states in his foreword he has compiled most of the information from questions he has been asked over a long period of years. This I believe was an excellent approach to this subject. I really believe that every question anyone could think of is answered there.

The plants closely related to water-lilies are amply covered in this volume. In making his selection of the "best" six, twelve and eighteen hardy water-lilies, Mr. Thomas very pointedly states that these are his personal choice. It is not to be expected that other growers will agree entirely with him in his selection.

The chapter on "all about goldfish" is just about that. The Thomases have been recognized as being the leading producers of goldfish, indeed even pioneers in the trade, so the information given in this chapter can be considered authoritative. All together the book is an excellent one on the subject.

CHARLES L. TRICKER
Saddle River, N. J.

HAWAIIAN FLOWERS AND FLOWERING TREES. Loraine E. Kuck and Richard C. Tongg. 158 pages, illustrated, indexed. Charles E. Tuttle Co., Rutland, Vt. 1958. (Printed in Japan.) $7.50

HAWAIIAN FLOWERS AND FLOWERING TREES is too exclusive a title for the 158-page book authored by Loraine E. Kuck and Richard C. Tongg. It tends to limit the book's reading to visitors and residents of tiny Hawaii alone. Of the 140-odd plants described and beautifully illustrated in color by Japanese artists, only five are strictly Hawaiian. The remainder are exotic, many to be found cultivated in gardens stretching from Bermuda and the islands of the Caribbean across Florida and Panama to California, Hawaii, the Philippines and spots in tropical Asia. Only a very few are found in gardens surrounding the Mediterranean.

Few books lack typographical errors. Here we note Merr misspelled for Merrill, De Condolle for deCandolle, Willde for Willdenow, A. Grey for A. Gray, Benthan for Bentham, and Britt for Britton. To dispel an ambiguity on page five the word "indigenous" might be replaced with "native but not endemic;" and for the articles about the coconut and hala, "flowers" at times should be replaced with "flower cluster." In mentioning *Euphorbiaceae*, some species are listed as members of the Euphorbia Family and others of the Splurge (instead of Spurge) Family. One name should have been used consistently.

The serious student will object to the scientific names given to ten of the plants pictured. The corrections, rather technical, are properly given in a technical journal like PHYTOLOGIA, not here. For example, the name *Thevetia nereifolia* should be deleted as obsolete because *T. peruviana* has priority by thirty-six years. Page forty-three requires revision. The species figured is *Cordia subcordata*, the true *kou* of Polynesia; while *C. sebestena* is the *kou haole* or geigertree of tropical America. The colored illustrations are beautiful and accurate except for the grey petals of the night-blooming cereus. These should be delicate ivory.

HAWAIIAN FLOWERS AND FLOWERING TREES, in spite of some shortcomings, is an ideal gift for myriads of northern garden lovers who wisely escape the rigors of winter by following migratory birds to warmer climes. Its style is pleasing, informative, not cluttered with botanical jargon found in Floras catering to more serious students and professional botanists. The book is distinctly not intended for the visitor interested in plants of the roadside and wide, open spaces. A local Flora is the proper book for him.

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GEO. W. PARK SEED CO., Greenwood 108, S.C.

LIVES IN SCIENCE. A Scientific American Book. 274 pages, illustrations, bibliography. Simon & Schuster, New York. 1957. $1.45

This book brings together the biographies of eighteen men, all of whom were scientists. The editors have selected the biographical sketches of the particular men to demonstrate the history of science. Part I is concerned with the great world system. Included are the lives of Galileo and Isaac Newton by I. Bernard Cohen; Robert Hooke by E. N. da C. Andrade; and Laplace by James R. Newman. Part II deals with the new world system and is illustrated by the lives of William Rowan Hamilton and G. F. Fitzgerald by Sir Edmund Whittaker. Part III is entitled "What is Fire?". The lives of Priestley by Mitchell Wilson, and Lavoisier by Dennis I. Duveen, are used to explain the question. Part IV, magnetism and electricity, includes Benjamin Franklin by I. Bernard Cohen; Michael Faraday by Herbert Kondo; Joseph Henry by Mitchell Wilson; and James Clerk Maxwell by James R. Newman. Part V involves the study of life. The lives of William Harvey by Frederick G. Kilgour; Charles Darwin by Loren C. Eiseley; and Pavlov by Jerzy

Konorski illustrate the science of biology. Part VI relates the lives of three mathematicians; Charles Babbage by Philip and Emily Morrison; Lewis Carroll by Warren Weaver and Srinivasa Ramanujan by James R. Newman. For each man a penciled portrait has been provided by Nernarda Bryson.

As indicated by the editors, the book includes only a random sampling of all of the many lifetimes which are involved in the history of science. The reader will find "two or three authentic giants, a hero or two, a saint and a rascal, sunny men of action and sour recluses and a selection of eccentrics, prodigies and sages." The book is interesting reading and can be recommended to everyone.

CLARK T. ROGERSON

EDIBLE WILD PLANTS OF EASTERN NORTH AMERICA. Merritt Lyndon Fernald and Alfred Charles Kinsey. Revised by Reed C. Rollins. 452 pages, illustrated, indexed. Harper & Bros., New York. Rev. ed. 1958. $6

This revision of an earlier edition, published in 1943, has used two books published since the first edition appeared, namely, the Eighth Edition of Gray's Manual and the New Britton and Brown by H. A. Gleason. The original bibliography is highly impressive and most helpful for other students of the same or similar subjects.

The material is well organized and indexed so it is easy to find plants and their characteristics and ways of preparing them as food. The headings are "key characteristics, habitat, range, season of availability and uses." There is also a character that is new to me, namely, "nibble."

In the description of lilies and trilliums, an admirable admonition is appended not to use them for food because they are rare and so handsome.

Occasionally, as would be the case with any reviewer, it would seem more could have been said about uses by the Colonists and Indians as in *Dioscorea Batatas*. But there are many bits of folk history as in the description of the gathering of beech nuts in Maine and the one telling how the Indians prepared acorns for food.

The herbarist as well as the nature lover will find their sojourns in woods and fields enriched by the knowledge of uses of wild plants contained in this valuable book.

HELEN M. FOX
Mt. Kisco, N. Y.

A FLORA OF SAN FRANCISCO CALIFORNIA. John Thomas Howell, Peter H. Raven, Peter Rubtzoff. 157 pages, illustrated, indexed. University of San Francisco, San Francisco, Calif. 1958. $3

San Francisco Bay was one of the earliest ports of call for the early exploring expeditions that touched our West Coast. Consequently, many of the types of new species of West Coast plants were taken in what is now the City of San Francisco. The original flora of this metropolis has always been of great botanical interest, and many good remnants of it remain within the city limits. There is now an increasing percentage of introduced plants in the flora. The authors have given a good account of the importance and history of the San Francisco flora, well illustrated by photographs of various habitats, and with a map. The bulk of the book gives an annotated list of the 608 native species and 447 introduced ones recognized. Descriptions and keys are not found here, but scientific and common names, together with valuable habitat notes and citations of specimens in many cases, are provided. The treatment is critical and complete for the area, and gives a picture of a flora that has been much altered in the course of a century.

DAVID D. KECK

CONSERVATION IN AMERICA. Dorothy Childs Hogner. 240 pages, decorations by Nils Hogner; indexed. J. B. Lippincott Co., Philadelphia, Pa. 1958. $3.75

A charming and friendly book. It is a digest of efforts to conserve wild life made by the many departments of the United States government interested in and dedicated to the conservation cause. This book was written after extensive trips throughout the United States and is an excellent book for persons and organizations beginning to think along conservation lines.

RENEE DONALDSON
Millbrook, N. Y.

NATURE IS YOUR GUIDE. Harold Gatty. 287 pages, illustrated, indexed. Foreword by Lieut. Gen. James H. Doolittle. E. P. Dutton & Co., New York. 1958. $4.95

The title of this extraordinarily fine volume should not mislead one into assuming that it is just another little "ooh-ah" nature book. It is very much more than this!

The author, a professional navigator (for the late Wiley Post among others), shows how the usually overlooked signs of nature can serve as effectively as printed markers to guide one along a highway. If you do not know how to make sure you are walking in a straight line, or, if you would like to learn to use your nose and ears more effectively, you will find instructions in this book. The writer in a very entertaining style discusses means of finding one's bearings in all sorts of terrain and under all sorts of weather conditions—even in cities. The stars, moon and sun contribute valuable data to this end and simplified "Sun Tables" in an appendix enable the amateur to become a skilled navigator. The book is fairly well illustrated and it has a reasonably complete index.

Every library concerned in any way with nature or navigation should be certain of having this book; it is especially recommended for the leaders of such outdoor groups as Scouts and summer camps. Indeed, anyone who has even a remote interest in biology and man's relationship within it will find this refreshing, rewarding reading.

RICHARD S. COWAN
Dept. of Botany
Smithsonian Institution

TROPICAL PLANTS AND THEIR CULTIVATION. L. Bruggeman. 228 pages, with 292 illustrations in color by Ojong Soerjadi; indexed. Studio Crowell, New York. 1957. (Printed in Holland.) $12

Despite the rich resources available to the horticulturist in the tropics, the cultivated flora of comparable regions tends to rely on a comparatively limited number of species. Therefore, this book, which in the original Dutch was titled *Indisch Tuinboek* and was for use in the Dutch East Indies, is of equal value in Florida, Hawaii, and similar regions. Over eighty percent of the species illustrated are grown in southern Florida.

The colored illustrations are the chief merit of the book. All of the 292 illustrations are reproduced from water colors by Ojong Soerjadi. Yet one wishes that some of the less known species described in the text had been chosen for the full color treatment instead of species *Cosmos* and *Petunia*, which can be found illustrated in most seed catalogues.

The plants are arranged alphabetically under such groupings as "Water Marsh Plants," "Cycads and Palms," "Trees," "Shrubs," etc. To find species of *Calathea* and *Anthurium* under the heading of "Perennial Herbaceous and Hardy Plants" is an unusual use of that category.

The descriptions are brief, sometimes too brief, and non-technical. Unfortunately, subjective adjectives are used, as is so often the case with horticultural literature. The adjective "handsome," after it has been used over one hundred and fifty times to describe the whole or part of as many different plants, ceases to have much meaning.

After each description, cultural notes are provided by W. M. Campbell, Curator at Kew. These cultural directions are for the most part of use with British growing conditions.

Certain inaccuracies were noted:

The description of *Philodendron selloum* indicates that another species, which is scandent, is the one described. *Crossandra infundibuliformis* is the preferred name for *C. undulifolia*. The description and plate of *Nymphaea lotus* clearly indicate that this is not the species. The flowers of *Victoria amazonica* are not bicolor, but change from one color to another as the flower ages. The true red shades of *Amherstia nobilis* and *Cassia javanica* are lost in reproduction. Plate 229 is probably *Calliandra inaequilatera* and not *C. haematona*. *C. portoricensis* does not come from Australia. *Euphorbia splendens* is more correctly known as *E. milii*. *Spathiphyllum commutatum* (plate 153) is another species in this genus.

M. R. BIRDSEY
Dept. of Botany
University of Miami

FRONTIERS IN CYTOLOGY. Edited by Sanford L. Palay. 529 pages, indexed; 253 plates. Yale University Press, New Haven, Conn. 1958. $9.75

This volume contains sixteen lectures given at Yale University in 1955. Many of the new techniques responsible for the current revived interest in cytology are treated by experts in well documented chapters. Contributions from electron microscopy, cytochemistry, histochemistry and cytophotometry exemplify the trends in modern analytical cytology. The book is not only informative but highly stimulating. Eighty seven pages of excellent plates, the majority electron photomicrographs, are included.

C. A. BERGER
Dept. of Biology
Fordham University

PRINCIPLES OF GENETICS. Edmund W. Sinnott, L. C. Dunn, Theodosius Dobzhansky. 459 pages, illustrated, indexed. McGraw-Hill Book Co., New York. 5th ed. 1958. $6.75

"Sinnott and Dunn," long a deservedly popular textbook in a rapidly expanding field, took on a new lease of life with the accession of Dobzhansky to its authorship in the fourth edition (1950). Now Dunn and Dobzhansky have rewritten and rearranged their material once more. The text goes considerably beyond what some teachers would consider digestible for students beginning the subject. Special chapters deal with population genetics, and the

account of chromosomal behavior is brought up to date. Biochemical investigations are brought in, with the newest views on the chemical nature of genes. There is a chapter on varieties of sexual reproduction, in which bacteria, bacteriophages, heterocaryons, haploidization, and mitotic reduction are considered. Polyploidy and speciation have their due place, and the inheritance of human traits has a chapter to itself. Statistical inference is concentrated in one chapter, by Howard Levene. All in all, this is certainly one of the most authoritative and comprehensive texts in its field.

H. W. RICKETT

AN INTRODUCTION TO THE PLANT KINGDOM. Norman H. Russell. 353 pages, illustrated, indexed. C. V. Mosby Co., St. Louis, Mo. 1958. $5.50

This description of the plant kingdom is intended for a one-semester introductory course in botany, for students who have had a course in biology or for those who have had none. For the former it should furnish a useful supplementary course. The classification, however, is that which arranges plants in "subkingdoms," Thallophyta and Embryophyta, which have little or no phyletic significance. Considerably over half of all species are placed in one "phylum." The "Gymnospermae" persist, a vestige of ancient error. For the beginning student the book will be considered of questionable value by those who think an introduction to plants should deal with their way of living rather than their various forms, with life rather than lives. The book is competently written and well illustrated, with a glossary of over three hundred technical terms.

H. W. RICKETT

THE COMPLETE BOOK OF FLOWERS AND PLANTS FOR INTERIOR DECORATION. Esther Wheeler and Anabel Combs Lasker. 190 pages, illustrated, indexed. Hearthside Press, New York. 1958. $7.95

This book provides a library of information for coordinating the arrangement of flowers and plants with beautiful furniture and artistic interior of the home.

The illustrations (both drawings and photographs) reflect the extensive background of the authors, Esther Wheeler and Anabel Combs Lasker.

It is a splendid book for the expert as well as the beginner; ideas that might be vague for specific occasion may be fully developed by consulting the pertinent sections.

It is suitable not only as ready reference in the home, but may be used as a textbook for teaching the "art of flower arrangement."

FLORENCE D. BARRY
Summit, N. J.

YEASTS. Edited by W. Roman. 246 pages, illustrations, index. Academic Press, New York. 1957. (Printed in The Netherlands.) $7.50

Edited by W. Roman, this volume brings together the story of yeasts by seven of the leading world authorities in the field of yeast biology and technology. The book is divided into six chapters, namely "Baker's Yeast," "Brewer's Yeast," "Wine & Fruit Yeasts," "Sake Yeasts," "Food Yeasts" and "Yeast Preparations." The cytology ond biochemistry is treated mainly in the first chapter since most of the scientific work has been done with baker's yeast. Dr. M. Pyke (Scotland) furnishes an historical introduction and a section on culture media. Professor W. J. Nickerson (New Jersey) describes the cytology and cytochemistry of yeast; the physiology is contributed by Nickerson and A. S. Schultz (New Jersey). The first chapter concludes with a discussion on industrial production by Dr. Pyke. Dr. R. S. W. Thorne (Denmark) wrote the chapter on brewer's yeast; Professor H. Schanderl (Germany) describes the wine and fruit yeasts. Yeasts utilized in making the rice wine, Sake, and other wild yeasts used in the Far East are discussed by Professor K. Arima (Japan). Dr. A. C. Thaysen (England) describes past and present status of food and fodder yeast, as well as its future possibilities. Dr. Pyke describes in the last chapter of the book the most important yeast preparations, both medicinal and nutritional. Each chapter is well documented with a list of selected references.

The book provides a needed summary of information on all aspects of yeasts and their uses. Outstanding are the discussions on biology and chemistry of yeasts. In general, the chapters are well written and easily understood. Unfortunately, numerous misspellings occur particularly in the scientific names which will cause some confusion

(Continued on page 40)

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NEWS, NOTES and COMMENTS

Twenty-three Water Color Paintings were hung in the Museum and Administration Building of The New York Botanical Garden, November 18-December 9, 1958. These were the works of Mrs. Beatrice Rindeman, Mrs. Alexander Botts, Mrs. W. H. Cautwell, Mrs. Richard W. Hubbard, Mrs. M. L. Frost, Mrs. Herbert E. Herrman, Mrs. Carol Deutschmann, Mrs. H. G. Nichol, Mrs. Martha Gangel, Mrs. W. K. Boulton, Mrs. Robert T. Brooks, Mrs. Pauline Melup, students of Edgar A. Whitney, A. W. S., in the course on "Flower and Landscape Painting in Water Colors" under the Garden's Educational Program.

The Exhibit of Seed Mosaics by Karl Mann, originally scheduled for display from November 1-December 1, 1958, in the Museum and Administration Building of The New York Botanical Garden, was extended through January 1959. Raymond Loewy, Industrial Designer, has this to say about Mr. Mann:

"Rarely does an original art form find so appreciative a group of critical collectors as the many designers who own Karl Mann's seed mosaics.

"The taste his work expresses, the exquisite workmanship, the forthright subject matter, all suit his pictures for a variety of uses. I have them in my collection where they are both decorative and aesthetically fresh.

"His medium is his own; he will have no important imitators. But the draftsmanship, the colors, the texture, the obvious discipline of both medium and size are special to the considerable creative ability this young artist reveals in his works to date.

"In the next decade many will claim to have discovered Karl Mann. If I were not the first, I still have the inestimable pleasure of owning some of his early output and look forward to his later works as well."

An Exhibit of Seaweeds has been made part of the permanent exhibit in the "Family of Plants" wing of the Museum and Administration Building of The New York Botanical Garden. This has been done by Mrs. V. S. Armbruster, art teacher with Cooperative Educational Service, of East Hampton, Long Island, for the Display Committee.

The seaweeds are mounted on three sheets of plexiglas, fifty-four inches square, and are enclosed in a glass case in such a way as to give the impression of floating. The base of the case is filled with sand, shells, pebbles, barnacles, crabs, and other items found along the seashore. The exhibit is well done and very beautiful.

A New Horticultural Center will be developed in Somerville, New Jersey, on part of Duke Farms, the twenty-three hundred acre estate of Miss Doris Duke. Miss Duke, President of Duke Gardens Foundation, Inc., and Charles Webster, President of the Horticultural Society of New York, have announced that certain lands and buildings will be devoted to research, to agricultural, botanical and horticultural exhibits, and to meetings of national plant societies and other garden groups.

Serving as an advisory committee to the Foundation in the development of this project are Miss Duke and four directors of the Horticultural Society of New York, Mrs. W. Redmond Cross, Bernardsville, N. J., Henry F. du Pont, Winterthur, Delaware, Dr. Harold E. Anthony, Englewood, New Jersey, and Mr. Webster.

Garden Tours for 1959. Jean Berke Travel Service, Inc., have planned seven tours, which enjoy the sponsorship of the Rhode Island Horticultural Society, the Massachusetts Horticultural Society, the Michigan Horticultural Society, the Ohio Association of Garden Clubs, and the Ontario Horticultural Association.

The Mediterranean Spring Tour, sailing from New York, March 27, on the "Cristoforo Colombo," and returning to New York, May 12, on R.M.S. Queen Elizabeth, will be conducted by Prof. Donald J. Bushey of Cornell University.

The European Spring Garden Tour, sailing from New York, April 24, on the S. S. Nieuw Amsterdam and returning to New York, June 2, on the R.M.S. Queen Mary, will be conducted by Prof. Clark L. Thayer, formerly head of the Department of Horticulture at University of Massachusetts.

The British Isles Spring Garden Tour, sailing from New York, May 12, on the R.M.S. Queen Elizabeth and returning on the same ship, June 23, has Dr. Carrick E. Weldon, Prof. of Horticulture, Michigan State University as conductor.

Scandinavian Garden Tour, sailing from New York, June 10, on the R.M.S. Queen Elizabeth and returning on the same ship, July 28, has Dr. Ernest K. Thomas, Executive Secretary of Rhode Island Horticultural Society as conductor. Dr. Thomas will also conduct the Orient Spring Garden Tour, flying from San Francisco, April 2, and flying back to that city, May 5.

Mexican Garden Tour, flying from New York, March 14, and flying back, April 5, will be conducted by Philip Clark, Editor of "Horticulture."

Hawaiian Spring Garden Tour, sailing from San Francisco on the S.S. Lurline, May 4, and returning to Los Angeles by the same ship, June 6, will be conducted by Victor H. Ries, formerly of the Department of Floriculture of Ohio State University.

Details as to fares, gardens, flower shows and other places to be visited may be obtained from Jean Berke Travel Service, Inc., 516 Fifth Ave., New York, N. Y.

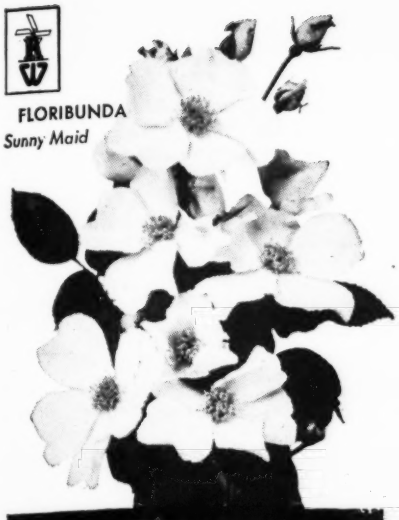
More on "Chinsegut Hill." There is another point that should be mentioned about Chinsegut Hill. Mrs. Margaret Dreier Robins was the moving spirit there, and it was she who brought down Dr. Small and was at the root of many plant introduction experiments. Most of the botanists who have visited Chinsegut Hill will remember Mrs. Robins, and I should like to see her activities remembered as much as the Colonel's.

Only today (October 31, 1958) did I have occasion to look up the exact translation of the word Chinsegut in my Innuit Indian Dictionary. It means: the spirit of lost things. So the interpretation isn't so far off after all.

LISA VON BOROWSKY
Vice President, Florida Audubon Society
Maitland, Florida

Grants to The New York Botanical Garden. Dr. William C. Steere, Director, has received a five-year grant of $29,000 for the study of Arctic American mosses. Dr. Arthur Cronquist, Curator, has received a three-year grant to support his work on vascular plants of the Inter-Mountain West —the area between the Sierra-Cascade axis

Dr. William C. Steere, Director of The New York Botanical Garden, Dr. James A. Oliver, Director of the Zoological Park, Dr. John Tee-Van, General Director of the Zoological Park and Aquarium, Lewis Anderson, Liaison Officer of the Park Department of the City of New York, Charles B. Harding, President of The New York Botanical Garden, and Dr. H. W. Rickett, Acting Assistant Director and Bibliographer of The New York Botanical Garden, are grouped together beneath the "Moon Gate" during a preview on November 6, 1958, of the Chrysanthemum Show in the Conservatory.



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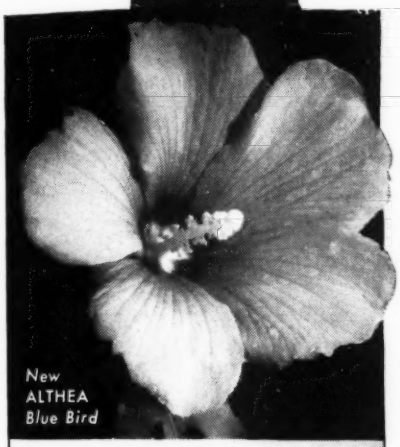

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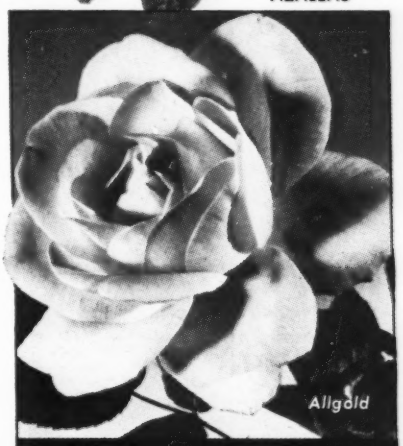

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***New* FLORIBUNDA, *Allgold*.** Worth its weight in gold if your garden could use a patch of bright sunshine yellow. From the opening of the first bud till the last petal falls, *Allgold* is heartier and handsomer than most Floribundas.

***New* ANCHUSA, *Loddon Royalist*.** Clouds of extra large blossoms of extraordinary blue cover this sturdy new form of Anchusa Dropmore. A medium-size, compact plant, it presents a vivid touch of color in your midsummer garden.

***New* ERIGERONS.** Never before such a variety of these delicate and hardy Dainty Daisies. Now choose from *Dignity*, a violet-lavender that deepens with maturity; *Felicity*, extra large deep pink or *Sincerity*, a light lavender-blue.

***New* HARDY PHLOX, *Starfire*.** Visualize, if you can, a really bright red phlox. It's *Starfire*, the most beautiful red phlox in the world today—a mass of color so dazzling it has to be seen to appreciate its brilliant effect.

***New* RHUS, *Notcutt*.** Gardeners who have been lucky enough to see this exclusive Wayside "wonder" know why it is the sensation of two continents. Its claret-to-black purple foliage and black-purple plumes are simply incomparable drama.

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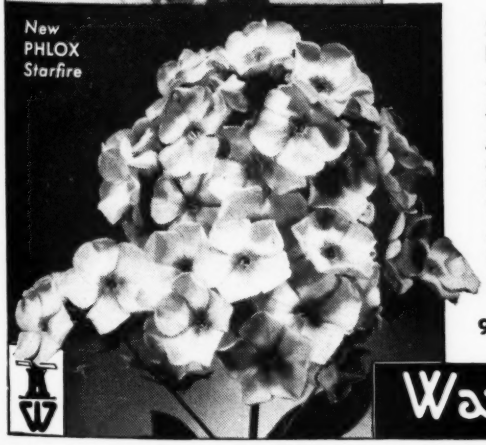
Loddon
Royalist

ERIGERONS

Sincerity

Felicity

Dignity



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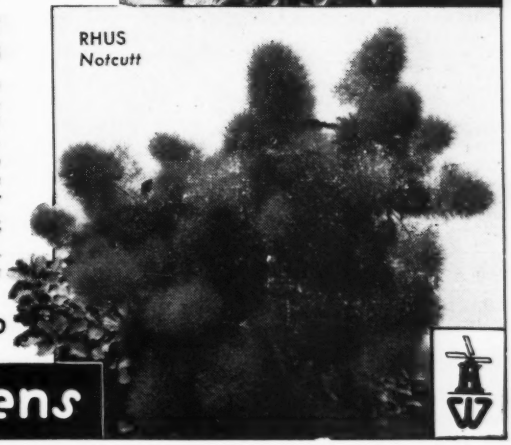

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on the west and the Rocky Mountain axis on the east. Dr. Marjorie Anchel, Research Associate, has received a three-year grant of $29,300 to continue her investigation of the metabolism of the basidiomycetes with special reference to polyacetylenes. Dr. William Silverman has joined the staff of the Garden's Research - Laboratory to assist Dr. Anchel in this research. Herman F. Becker, Paleobotanist, is on loan from Brooklyn College for the next two years during which he will organize and catalog the paleobotanical collection at the Garden and pursue his studies on the Oligocene Flora of the Ruby Mountains of southwestern Montana under a grant of $19,800. All these grants have been made to The New York Botanical Garden by the National Science Foundation.

Dr. Steere elected to Office. Dr. Steere was advised on December 16, 1958, that he had been elected president of the American Plant Taxonomists for 1959. Dr. Steere has also just begun his duties as president of the Botanical Society of America.

Herbarium Specimens, collected and mounted by students of the class in Field Botany, are currently on display at the far end of the Economic and Food Plant Wing of the Museum and Administration Building of The New York Botanical Garden. This extremely interesting exhibit reflects creditably on the students and the instructors of the class, Dr. John Wurdack, Associate Curator, and Joseph Monachino, Associate Custodian of the Herbarium of The New York Botanical Garden. To receive credit for their subject the students were required to submit for inspection at least seventy-five identified and mounted specimens representing at least twenty plant families. There is variety in the plant material collected and evidence of care in pressing and mounting the material. Not all have been correctly executed, as indicated by the instructors' comments, but this very fact adds to the interest and educational value of the exhibit.

The Thirteenth Annual American Horticultural Congress, held at Colonial Williamsburg, October 22 to 25, 1958, was one of the most successful, with over one hundred and fifty delegates from all parts of this country and Canada.

Twelve horticultural congresses have been held in different parts of the United States and their proceedings published. Two editions of the Directory of American Horticulture and an excellent Color Chart have been published. Other publications include the Code of Nomenclature for Cultivated Plants, a Handbook for Plant Originators and Registrars, and the A.H.C. News which is issued quarterly. A Plant Hardiness Zone Map will be distributed in December.

The American Horticultural Council has represented American horticulture at International Congresses, participated in the Liberty Hyde Bailey Celebration and in the Gardening and Horticulture stamp publicity, and given awards and citations to individuals for outstanding work in horticulture.

The Liberty Hyde Bailey medal was awarded for the first time at the Congress in Williamsburg. It was presented to John C. Wister for his contributions in the fields of teaching, writing, editing, and landscape art, for his long years of leadership and his exemplary spirit of service to the horticultural world. The Liberty Hyde Bailey medal, established by the president of the Council, Dr. Albert J. Irving, was designed by Edmund Amateis of Brewster, New York, National Academicean and past president of the National Sculpture Society. Mr. Amateis is also an amateur horticulturist, whose principal interest is in rhododendrons.

Others honored at the Congress were Arno Nehrling with a citation for lifetime service to horticulture in many capacities and particularly as a producer of exceptionally fine flower shows during the last twenty-five years; Mrs. Lewis M. Hull for inspirational leadership in the advancement of horticulture and good gardening on national and international levels; David Burpee for his contributions to the development, production and merchandising of seeds for the gardens of the world; Thomas Dolliver Church for pioneering the introduction of new plants for West Coast gardens and for recognizing the potential in native plants; and Victor H. Reis for his long service as writer of books and articles on gardening and for leadership in extension work in gardening.

Efforts of the Council have been felt in establishing standards and ethics in horticultural advertising and in securing a proper appropriation for the U. S. National Arboretum in Washington, D. C. The A.H.C. is working on a program of plant testing and registration with the American Association of Nurserymen and the American Association of Botanical Gardens and Arboretums, and on a program to further horticultural education through its member organizations, botanical gardens and arboretums, and teachers' education in state and federal departments of education. It is planning participation in the International Horticultural Exposition in Rotterdam in 1960 and in the International Horticultural Congress in Brussels in 1962, and anticipates extending an invitation to the International Horticultural Congress to meet in this country in 1966.

The Fourteenth Annual American Horticultural Congress will be held in Rochester, New York, in 1959, with the Park Department of the City of Rochester as host.

Mrs. Dorothy Ebel Hansell, Editor of The Garden Journal, represented The New York Botanical Garden at the Congress. Mrs. Hansell was appointed editor of the Proceedings of the Congress and of A.H.C. News.

Norfolk Botanical Garden. The new botanical garden in Norfolk, Virginia, established formally by Council action on February 18, 1958, presents a new concept in such a garden for America. It is being created on virgin land, adjacent to the extensive and very beautiful municipal camellia and azalea plantings in a naturalistic woodland setting of oaks, dogwoods, hollies and magnolias, and will eventually have living representatives of all the plant material suitable for the southeastern area. Such plants will be properly exhibited and labeled —in their families and genera.

The Old Dominion Horticultural Society, which has been the guiding spirit, is expected to continue as the main coordinator and fund-collecting agency. Frederic Heutte who is superintendent of the Bureau of Parks and Forestry of the City of Norfolk is the Director of the Norfolk Botanical Garden.

Biltmore Estate to Test Rhododendrons. The newly-created rhododendron collection at Biltmore Estate, Asheville, North Carolina, has already received national recognition. The American Rhododendron Society has designated the new plantings as an official test garden.

"We in the Southeast are in one of the finest rhododendron growing areas in the world," commented Dr. Fred J. Nisbet, superintendent of the Estate. "It is unfortunate that we have limited our plantings in the past mostly to a few native kinds. There are literally thousands of sorts which could grow here, for we have a wonderful combination of soil and climate. Many of the Asiatic species and European hybrids are among the choicest shrubs. What we have to do now is to find out which are adapted to our conditions."

A judging committee of the recently formed Southeastern Chapter of the American Rhododendron Society will pass on the performance of species and varieties grown at Biltmore.

An article on Biltmore Estate has been prepared by Dr. Nisbet for the March-April 1959 issue of The Garden Journal.

Sixth Annual Flower Show Symposium, of the Federated Garden Clubs of New York State, Inc., will be held in the Grace Rainey Rogers Auditorium of the Metropolitan Museum of Art, New York City, January 13-16, 1959. Louis P. Politi, Horticulturist of The New York Botanical Garden, will talk on "Potted Plants in Flower" at the Wednesday morning session, covering basic principles of good culture and emphasizing standards of judging them; while in the afternoon of the same day H. Gleason Mattoon, of the Holly Society of America, will discuss deciduous and evergreen hollies of Asia, Europe and North America that are grown in this country.

Other speakers include Mrs. Esther Wheeler on "Judging a Japanese Flower Arrangement," Mrs. Edward L. Alexander on "Color in Flower Arrangement," Mrs. J. Lloyd Berrall on "Flowers Through the Centuries," and Mrs. William A. Williams who will lecture and demonstrate table settings.

All-America Mums. Announcement has been made of the garden chrysanthemums to win the All-America Award for 1959: 'Crimson Lady,' cushion type in crimson-red; 'Girl Friend,' decorative type in blended coral; and 'Flair,' cactus or star-flowered cushion type in lavender.

All-America Selections. Only one flower received the All-America Award for 1959, alyssum 'Pink Heather.' This is the first pink variety; according to Ridgway's Color Chart, it is between Laelia-pink and Rhodonite-pink; while Nickerson's Color Fan places it as a purplish pink.

There were two vegetables to receive the All-America Award for 1959: Brussels sprouts 'Jade Cross,' a first generation hybrid from Japan, an early, uniform and heavy producer; and snapbean 'Garden-green,' that has flavorful, stringless pods, five and a half inches long, round and quite straight. 'Jade Cross' is the highest voted entry for seven years and merits the coveted silver medal award.

Historic Garden Week in Virginia. April 18-25, 1959 are the dates for the 26th Annual Historic Garden Week in Virginia, sponsored by the Garden Club of Virginia. This event occurs annually the last full week in April.

The garden restoration at "Woodlawn Plantation" has been completed, and there is an interesting restoration to which the 1959 proceeds will be applied — the grounds of the Adam Thoroughgood House in Princess Anne County, just ten miles from Norfolk. This house is said to be the oldest brick house still standing in its entirety in Virginia. Built by Adam Thoroughgood, himself, between 1636 and 1640, this small but charming building warrants the establishment of a suitable garden on the small acreage surrounding it.

A guide book may be obtained from Historic Garden Week, Room 3 Mezzanine, Hotel Jefferson, Richmond 19, Virginia.

The first edition of EXOTICA, published in 1958, was completely sold out. The author, Alfred B. Graf, is revising the book, adding descriptions and photographs of plants, and will have it ready for the press shortly. The second edition will be priced at $22.00; prepublication price is $20.00. Members of The New York Botanical Garden may deduct 10% from this price in placing their orders through Book Service.

Dr. John Shaw Boyce, professor emeritus of forest pathology at Yale University, has been named director of the Bartlett School of Tree Surgery at Stamford, Connecticut. Prior to his association with Yale, Dr. Boyce was director of the Northeastern Forest Experiment Station and a principal pathologist of the U.S.D.A., Bureau of Plant Industry.

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(from inside front cover)

after forty years with the U.S.D.A. Bureau of Plant Industry, where he was concerned with plant breeding and nutrition, day length and plant growth. Dr. Allard spent considerable time collecting plants and insects in the rain forest areas of Hispaniola and Peru... CHARLES A. ROBINSON is a retired professional gardener and one of the charter members of the Men's Garden Club of Toledo, Ohio... GERTRUDE B. (MRS. PHILIP) FOSTER is Editor of HERB GROWER MAGAZINE . . . WALTER SINGER is foreman of The Conservatory of The New York Botanical Garden.

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BOOK REVIEWS (from page 35)

for readers. Also, there is no apparent effort to standardize the use of scientific names from chapter to chapter. Despite these faults, the book is recommended to all who are curious about yeast.

CLARK T. ROGERSON

SOILS. AN INTRODUCTION TO SOILS AND PLANT GROWTH. Roy L. Donahue. 349 pages, illustrated, indexed. Prentice-Hall, Inc., Englewood Cliffs, N. J. 1958. $6.75

This book is written by a man who has learned a good deal about the soil from observation and experience and from association with an impressive number of outstanding soil scientists. The first portion deals with the fundamentals of soil science and plant nutrition. This is a rather brief but fairly concise description of the physical, chemical and biological properties of the soil together with its formation and classification. The final chapter in this section deals with plant nutrition and the rule of the essential nutrient elements in plant growth.

The second and larger portion of the book is devoted to the applied aspects of soil science. It deals with the characteristics and use of lime, fertilizers, manures and organic residues; irrigation, drainage, tillage and soil and water conservation practices; and the management of soils of humid, semi-arid and arid regions as well as peat and muck soils.

The outstanding feature of this book is the manner in which practically every soil property and management practice is illustrated.

This book is written for the person who is more interested in the use of the soil than in a more technical treatment of its many characteristics. It is easy to read and much of it would be understandable to those without too much knowledge of the physical and biological science.

RUSSELL B. ALDERFER
Chairman, Soils Dept.
Rutgers University

SOIL CHEMICAL ANALYSIS. M. L. Jackson. 498 pages, illustrated, indexed. Prentice-Hall, Inc., Englewood Cliffs, N. J. 1958. $9

This book is not recommended for gardeners or for teaching an undergraduate course in soil chemistry. Essentially it should be classified as a "cookbook" of methods for analyzing soils and plants by chemical and instrumental techniques. Basically, the book does not contain adequate explanations of principles of methods outlined and therefore should not be used in teaching a basic course in soil chemical analysis.

The author should be congratulated, however, for compiling the most important methods of soil chemical analysis into a single reference source. It is a book that all investigators in soil research cannot be without.

STEPHEN TOTH
Soils Dept.
Rutgers University

GARDENING, FORCING, CONDITIONING AND DRYING FOR FLOWER ARRANGEMENTS. Arno and Irene Nehrling. 228 pages, illustrated (drawings by Charlotte E. Bowden and Charles A. Mahoney); indexed. Hearthside Press, New York. 1958. $3.95

GARDENING, FORCING, CONDITIONING AND DRYING FOR FLOWER ARRANGEMENTS by Arno and Irene Nehrling is a lengthy title, but the book embodies concise information in one volume, not only in landscaping and culture of growing plants, but also in preparing them for flower arrangements. Written in a clear manner, this is a book long desired by arrangers—and is a must for every one of them.

The first four chapters include garden design with trees and shrubs for easy upkeep, annuals so necessary as "fillers," as well as for cutting, and perennials, the real backbone of the flower border.

In the following chapters one reads about flowering bulbs, corms, rhizomes and tubers, learns about the how and why of pruning, and finds an excellent time table for forcing over fifty kinds of cut branches.

The winter bouquet enthusiast will be delighted by a list of more than three hundred plants which can be dried for her arrangements.

The vegetable garden with herbs awakens the interest to the possibilities of using leaves, flowers and seed pods in arrangements as well as for food.

A special notation should be made of the book's excellent cultural directions and the unusual listing of botanical as well as common names.

The book is well illustrated with photographs and drawings by Charlotte E. Bowden and Charles A. Mahoney.

MARY F. JOHNSON
Pompton Lakes, N. J.

FLOWER CHRONICLES. Buckner Hollingsworth. 302 pages, illustrations, bibliography. Rutgers University Press, New Brunswick, N. J. 1958. $5

Having failed to find any book giving the histories of her favorite flowers, Mrs. Hollingsworth set about compiling one herself, even though it had to be the effort of an amateur. What she lacked in formal qualifications, however, she made up in enthusiasm and industry. The result is a discursive but pleasant book on the background of fifteen familiar flowers. These are rose, iris, lily, peony, tulip, saffron crocus, daisy, poppy, cornflower, primrose, nasturtium, dahlia, marigold, pinks and carnations, and narcissus.

This is not in any sense a botanical book and its stories are by no means confined to history: any byway tempts the writer to wander, though she keeps fairly clear of foolish "legends." It is a cheerful collection of chat on odds and ends, not at all a work of reference for students. A twelve-page bibliography is included.

The volume has been attractively produced, illustrated with many reproductions of old woodcuts, most of them clearly printed, and appropriately bound in gay boards and yellow cloth.

F. C. COULTER
Orange, Conn.

HOW TO MAKE EARTHWORMS PAY. Tom Parsons. 126 pages, illustrated by Frank Oates. Abelard-Schuman, New York. 1958. $3.

The lowly worm has turned, and into a magnificent asset to all who garden! And the raising of them can be a profitable hobby or a full-time business.

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The worms emerge at night and convert anything organic that is about into beautiful top soil. There are many many reasons why earthworms are needed by all who garden.

JEAN HERSEY
Westport, Conn.

THE TRUE BOOK OF DESERTS. Elsa Posell. 47 pages, illustrations by Carol Rogers. Children's Press, Chicago, Ill. 1958. $2

THE ARCTIC TUNDRA. Delia Goetz. 64 pages, illustrated by Louis Darling. Wm. Morrow & Co., New York. 1958. $2.50.

SEE THROUGH THE LAKE. Millicent Selsam. 48 pages, illustrated (pictures by Winifred Lubell). Harper & Bros., New York. 1958. $2.50.

HOW DOES A GARDEN GROW? Ann Towson Brown. 48 pages, illustrated (photographs by Peggy Plummer Sanders). E. P. Dutton & Co., New York. 1958. $2.50

Nature Books for the Younger Generation

Four new and different books on nature for children, six to fourteen years of age, can be recommended for entertaining reading. Another "True Book," this one on deserts, is written so simply by Elsa Posell using words from the Combined List for Primary Reading, in very large type, that it would be a challenge for a new reader to tackle by himself once he had seen the fascinating color illustrations by Carol Rogers. THE ARCTIC TUNDRA by Delia Goetz describes a cold desert in greater detail. This is a good book for ten to fourteen year old readers or to be read to a younger child with an interest in the North. Black and white drawings by Louis Darling are especially lovely of the arctic birds.

Millicent Selsam has written another delightful book that would make an excellent gift for a child about to spend his first vacation near a lake. SEE THROUGH THE LAKE tells both in simple text, colored illustrations and charts, the life cycle of plants and animals living in the water.

HOW DOES A GARDEN GROW answers in photographs this question which two sisters asked of themselves. Their story is told largely through their conversation as they plan, plant, tend and finally sell their garden produce at a roadside stand. Ann Towson Brown has written the text and Peggy Plummer Sanders took the pictures which illustrate each page.

MURIEL T. ORTMEYER
New York, N. Y.

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